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SUSQUEHANNA RIVER BASIN - JUNIATA RIVER. A COOPERATIVE STATE-FEDERAL REPORT ON WATER POLLUTION CONTROL

Public Health Service
New York, New York

May 1951

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SUSQUEHANNA RIVER BASIN

JUNIATA RIVER

A Cooperative State-Federal Report on Water Pollution Control

Sanitary Water Board
Pennsylvania Department of Health

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Public Health Service
North Atlantic Drainage Basins

77

REPORT ON WATER POLLUTION CONTROL

JUNIATA RIVER BASIN

SUSQUEHANNA RIVER DRAINAGE BASIN

Prepared by

FEDERAL SECURITY AGENCY

Public Health Service

Division of Water Pollution Control
North Atlantic Drainage Basins Office

May 1951

In Cooperation with -

The Sanitary Water Board, Pennsylvania Department of Health

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INTRODUCTION

The Federal Water Pollution Control Act, Public Law 845, passed by the 80th Congress in June of 1948, provides for full recognition of the primary responsibilities and rights of the States in controlling water pollution. It requires the Surgeon General of the Public Health Service to cooperate with other Federal agencies, with State and interstate water pollution control agencies, and with municipalities and industries in the preparation or adoption of comprehensive programs for eliminating or reducing the pollution of interstate waters and tributaries thereof, and improving the sanitary condition of surface and underground waters.

In developing these programs, due regard must be given to improvements necessary to conserve the Nation's waters for public water supplies, propagation of fish and aquatic life, recreational purposes, agricultural, industrial, and other legitimate uses.

As a first step in carrying out this requirement, the data available as of July 1, 1950, were presented in summary type reports covering the major drainage basins in the United States, the data concerning the Susquehanna River Basin being presented briefly in the summary report on the North Atlantic Drainage Basins.

This report describes the status as of May 1951 of the comprehensive water pollution control program conducted by the Pennsylvania Sanitary Water Board in the Juniata River Basin, a sub-basin of the Susquehanna River Basin. It sets forth information about the ways the water resources of the area are used, the pollution entering those water resources and the resulting damages, the benefits which may result from pollution prevention and abatement, pollution prevention measures in effect, and those which appear to be needed. Its scope is limited to surface water pollution control. Ground water pollution has not been considered in the report although usage of ground water is mentioned. While it is true that additional information is needed to complete the program, the objectives have been established and general plans for attaining them have been adopted by the State. The streams in the Basin have been classified by the Sanitary Water Board and the required degrees of treatment specified. The program is well advanced with the major portion aimed toward completion by 1953.

The data on which this report is based have been compiled through and in cooperation with the Sanitary Water Board, Pennsylvania Department of Health. Through this agency, additional data have been obtained from other State officials, municipal officials, and representatives of industry. Federal agencies also have cooperated.

The detailed data and remarks relating to individual sources of pollution appearing in Basic Data Tables 1 and 2, are the determination of the Pennsylvania Sanitary Water Board and are included to illustrate the status of the program, as of May 1951.

Comprehensive programs for pollution control must necessarily be

fluid. They must allow for growth, development, and changing conditions. The program now in effect in this area appears to fit the current needs. Reappraisal in the course of time will provide for adjustments as the need arises.

A sincere effort has been made by all who contributed to this report to present a fair picture of the complex water pollution problems in the Juniata River Basin and to present reasonable conclusions and recommendations. It is our hope that this report will help in safeguarding the water resources in this area.

ACKNOWLEDGMENTS

The Public Health Service wishes to acknowledge the cooperation and assistance of those agencies and individuals that have contributed to the preparation of this report.

The Sanitary Water Board in the Pennsylvania Department of Health, the water pollution control agency of the State of Pennsylvania, has furnished the data from which the various tables were prepared and other data and information contained in the narrative statements. This agency has also reviewed the preliminary draft of the report and has offered valuable comments and suggested changes. In general, the preliminary draft has been revised so that the report is in agreement with the comments and suggestions of the State agency.

Other State agencies including the Department of Health, Department of Forests and Waters, Department of Internal Affairs, Department of Mines, Department of Agriculture, Fish Commission, Game Commission, and State Planning Board contributed information for the report, and in general, reviewed the preliminary draft and submitted helpful comments.

Federal agencies from which assistance was obtained include the Corps of Engineers, Department of the Army; the Geological Survey, the Fish and Wildlife Service, and the National Park Service, Department of the Interior; the Bureau of the Census, and the Weather Bureau, Department of Commerce; the Soil Conservation Service, Department of Agriculture; and the Federal Power Commission. They have further contributed to the development of this report by their cooperation in reviewing the preliminary draft.

Finally, there is acknowledged the assistance of individuals interested in water resources development and conservation, who have contributed information through other sources than those listed above.

SUMMARY

The Juniata River Basin has a drainage area of approximately 3406 square miles in the south central part of Pennsylvania and extends in a long sweeping curve from the southwest near the State boundary to the northeast where it meets the Susquehanna River. The region is generally mountainous with about 62% in forest land covered with second growth timber. General farming predominates in the fertile limestone valleys.

The estimated population of the Basin is 287,400 or a slight decrease since 1940. There are 51 incorporated municipalities in the Basin, consisting of 50 boroughs and the City of Altoona, which contain approximately 54% of the population.

Important industrial centers are the City of Altoona, and the boroughs of Burnham, Hollidaysburg, Huntingdon, Lewistown, Tyrone and Williamsburg, the principal industries engaging in the manufacture of metal, textile, paper and printing, and food and kindred products. Bituminous coal is mined in the Broad Top field in the southwestern portion of the Basin.

The Basin has well developed recreational areas in the State Parks and Forests and at the commercial and organizational camps throughout the area, and the many private properties along the streams. Excellent hunting and fishing facilities are available throughout the entire area.

Water for domestic and industrial use in the Basin is taken from both surface and underground sources. Practically all of the surface supplies are obtained from impoundments on upland streams not subject to pollution from municipal or industrial waste waters. About 64% of the Basin population is served by public water supply systems which supply about 19,145,000 gallons per day. Thirty communities are served with public supplies obtained exclusively from wells and springs. Ground water is used extensively for domestic and stock watering purposes in the rural areas and small villages.

Industrial establishments use considerable ground water obtained from the larger springs and drilled wells. Surface streams supply the sand and stone washery operations, two hydroelectric power plants, one steam-electric power plant, and portions of the supplies used by the pulp and paper companies and the chemical rayon industry.

The Juniata River and its tributaries receive the discharges from 28 municipal sewer systems which serve a population of 148,400 or about 52% of the estimated population of the Basin. The pollution load discharged to the streams is equivalent to that from a population of 108,800, the reduction of 27% being accomplished through the operation of 8 municipal sewage treatment plants. The main stem of the Juniata River receives about 33% of the municipal pollution, the Little Juniata River about 30%, the Frankstown Branch about 29%, the Raystown Branch about 6%, and Kishacoquillas and Aughwick Creeks jointly receive about 2%.

Wastes from 15 sources of pollution contributed by 14 industrial establishments are discharged directly to the streams. About one half of the establishments discharge organic wastes, the pollution load of which is undetermined. The principal sources are the pulp and paper mills and the chemical rayon industry.

Sources of gross local pollution adversely affect the streams in the Juniata River Basin. The discharge of untreated or inadequately treated municipal sewage presents a potential danger to public health. Acid mine drainage is of lesser magnitude than in other drainage basins in the State, but it has polluted about 60 miles of streams within the basin and has lowered the productive capacity for aquatic life in many more miles of streams. Discharges of industrial wastes have resulted in stream discoloration and foaming, numerous fish killings and have rendered sections of the streams unsatisfactory for recreational purposes and as sources of industrial water supply. Soil erosion is a problem in the Basin. Data are not available concerning the amount of silt deposited in the streams, but surveys on similar land just outside the Basin indicate it to be considerable. Operation of the existing hydro-electric plants reduces the dependable flow of the streams below the storage reservoirs and affects the ability of the streams to recover from pollution.

There are eight municipal sewage treatment plants in the Juniata River Basin serving a population of 94,900 or approximately 64% of the estimated sewered population. About 55% of the sewered population is served by four primary treatment plants and 9% of four secondary treatment plants. There are 20 municipal sewer systems serving 36% of the sewered population which have no treatment and are in need of new sewage treatment plants. Also, the four primary treatment plants are inadequate to provide the degree of treatment required by the State's program for cleaning up the streams in the Basin to serve the principal uses of domestic water supply, animal or aquatic life, industrial consumption and recreational purposes.

Industrial waste treatment facilities are provided at 10 establishments, one of which has a separate plant for treatment of sewage. Five of these installations, including the separate sewage treatment plant, are in need of improved or additional treatment facilities, one is in need of replacement and new plants are required for four establishments which have no waste treatment facilities.

A list of the municipalities and industries needing improvements as of May 1951 for abatement of pollution in the Juniata River Basin is set forth in Table L. Basic data as of May 1951 on the sources of municipal and industrial pollution in the Basin appear in Tables 1 and 2 in the Appendices.

The operation of the existing municipal and industrial waste treatment facilities has resulted in a decrease of the health hazard from water pollution, improvement of the stream water available for industrial use and an increase in the recreational value of the water resources of the Basin.

No new sewage treatment plants were completed in the post war period

of 1946 to 1950 although two new plants are now under construction in the City of Altoona to replace existing inadequate plants. Five industrial waste treatment plants were completed during the same period and three were placed under construction.

Pennsylvania has adequate water pollution control legislation. In order to protect and improve the quality of the water on the streams for the recognized uses, the Sanitary Water Board has classified the streams in the Juniata River Basin as substantially clean streams and ordered "complete" treatment of sewage and an equivalent treatment of industrial wastes before discharge to the streams.

Considerable progress is being made in the State's comprehensive program for stream pollution control in the Basin. The first phase, or completion of plans for treatment works, is practically completed, with the exception of the smaller dairy plants and slaughter houses which were surveyed recently. Orders for construction of waste treatment facilities have also been issued in the majority of cases.

Two new sewage treatment plants under construction by the City of Altoona will serve a population of 78,000. Final plans for new or improved sewage treatment plants have been approved for an additional 17 municipalities to serve a population of 54,100. Active planning is underway by five municipalities to serve 3600 persons. Eleven of the municipalities are under orders to complete the construction of primary treatment units by May 1, 1952 and seven municipalities by January 1, 1953.

Of the ten required new or improved waste treatment facilities for nine industrial establishments, three are under construction, final plans have been approved for three including plans for additions to a sewage treatment plant at one establishment, and four are in the active planning stage.

Specific standards have been adopted for certain industrial wastes. Research sponsored by the Sanitary Water Board has been underway for several years seeking a solution of the problem of stream pollution from acid mine drainage. A research project on the treatment of wastes from small slaughter houses has recently been completed.

In order to complete the information on stream pollution and its effects in the Basin, additional data are needed pertaining to the amount of pollution discharged from the industries, the quality of stream water and improvements resulting from pollution control, and data concerning the industrial use of surface waters and quality necessary or desirable for such use.

The State has an excellent public information program through which it has enlisted the cooperation and support of municipal and industrial officials and the general public in the problem of pollution abatement.

Grant-in-Aid payments up to 50% of the cost of plans for sewage treatment works, based upon the 1942 price level are paid to municipalities from State funds after approval of the plans.

Provision is made by State Law for municipalities to establish Authorities to finance the construction of municipal sewage treatment works and use sewer rental charges to amortize the bonds. Direct obligation bonds can also be issued by a municipality under certain constitutional limitations.

It is estimated that the cost of providing the municipal sewage treatment plants, intercepting sewers, pumping stations and related appurtenances to accomplish the stream pollution abatement program in the Juniata River Basin will be approximately $8,000,000 at present day prices. Data are not available to determine the estimated cost of the needed industrial waste treatment facilities.

A statistical summary of the data set forth in the report is shown in the following tabulation.

JUNIATA RIVER BASIN

Summary Statistics on Pollution

May 1951

Extracted and Condensed from Tables in the Report

	SOURCES OF POLLUTION	
	Municipal	Industrial
Number	28	15*
Population Served	148,400	

	EXISTING WASTE TREATMENT FACILITIES					
	Municipal			Industrial		
	Primary Treatment	Secondary Treatment	No Treatment	Treatment	No Treatment	Undetermined
Number	4	4	20	11*	4	
Population Served	82,200	12,700	53,500			

	ADEQUACY OF EXISTING WASTE TREATMENT FACILITIES					
	Municipal			Industrial		
	Satisfactory	Unsatisfactory	Undetermined	Satisfactory	Unsatisfactory	Undetermined
In Capacity	4	4	-	5	6*	-
In Operation	6	2	-	9*	2	-

	WASTE TREATMENT NEEDS					
	Municipal			Industrial		
	No Project Needed	Project Needed	Undetermined	No Project Needed	Project Needed	Undetermined
Number	4	24	-	5	10*	-
Population Served	12,700	135,700	-			

	CURRENT STATUS OF ACTION ON TREATMENT NEEDS					
	Municipal			Industrial		
	Under Construction	Planning or Plans Approved	Inactive	Under Construction	Planning or Plans Approved	Inactive
Number	2	22	-	3	7*	-
Population Served	78,000	57,700	-			

* Includes a separate sewage treatment works at an industrial establishment.

CONCLUSIONS

A review of the data contained in the report indicates the following conclusions.

1. The Sanitary Water Board, Pennsylvania Department of Health, in order to protect and improve the quality of the water in the streams for domestic water supply, animal and aquatic life, industrial consumption and recreational purposes, has a comprehensive program underway to eliminate the sources of pollution and render the streams generally clean throughout the Juniata River Basin.

2. The first phase of the State's stream pollution abatement program which involves the preparation and approval of plans for municipal and industrial waste treatment works is practically completed in this Basin. In the second phase, which pertains to the construction and operation of the required waste treatment facilities, orders have been issued in the majority of cases specifying dates for compliance.

3. The operation of the existing municipal and industrial waste treatment works has improved stream conditions. Additional improvement will be provided upon the completion of the waste treatment facilities now under construction. The major portion of the program throughout the Basin is aimed toward completion by 1953.

4. The pollution of the streams in the Basin by acid mine drainage, while serious, is not of major proportions when compared to that of other drainage basins in the State. This is a problem in need of a practical solution.

5. The wide fluctuations of stream flows which occur several times daily as the result of intermittent releases from the dams of the two hydro-electric plants are not conducive toward stream pollution control.

6. Additional information is needed to determine the pollution load being discharged to the streams from industrial establishments, the extent of damage to the streams as the result of silt load from soil erosion, stream water quality, industrial water requirements and water uses.

7. The outstanding public information program by the State on water pollution control has been a decided factor in the accomplishments which have been achieved thus far in pollution abatement within the Basin.

RECOMMENDATIONS

It is recommended that:

1. Existing adequate municipal and industrial waste treatment plants be operated at maximum efficiency and action be expedited by the municipalities and industries (Table L) required to provide water pollution abatement projects in accordance with the comprehensive program of the Sanitary Water Board, Pennsylvania Department of Health to protect and improve the sanitary quality of the water in the streams as provided for by State law.

2. The State supplement existing information in order to obtain more complete data concerning the waste pollution load, acid mine drainage, stream water quality, water use, requirements of water resources for industrial purposes, and appraise improvements resulting from pollution control measures effected.

3. Consideration be given to the regulation of water releases from the dams of the hydro-electric plants in order to improve stream conditions.

4. Research be expanded to find a practical solution of the acid mine drainage problem and on problems relating to methods of treatment of sewage and industrial wastes and water quality requirements.

PHYSICAL DESCRIPTION

The Juniata River Basin lies in the south central part of Pennsylvania. It is wholly within the Ridge and Valley province of the Appalachian Highlands and consists of a series of narrow mountain ridges and wide or narrow valleys extending generally in a long sweeping curve from the southwest to the northeast. The highlands and ridges are well wooded and the valleys generally fertile. The Basin is approximately 110 miles in length with a maximum width of approximately 50 miles in the central portion.

The Juniata River is about 100 miles in length and is the principal tributary to the main stem of the Susquehanna River which it enters at Duncannon, Perry County about 16 miles upstream from Harrisburg. It is formed by the junction of the Little Juniata River, about 30 miles in length with the Frankstown Branch of the Juniata River 46 miles in length, one mile west of Petersburg.* The Juniata River and its tributaries drain an area of approximately 3406 square miles.

All or part of 12 Counties lie within the Basin with an area in square miles for each County as follows:

County	Total Area Sq. Miles	Estimated Area in Basin Square Miles
Bedford	1,018	706
Blair	530	529
Cambria	695	37
Centre	1,115	84
Franklin	754	31
Fulton	435	119
Huntingdon	895	894
Juniata	387	351
Mifflin	431	404
Perry	550	209
Somerset	1,084	27
Snyder	329	15
	8,223	3,406

* 1939 - U.S. Board of Geographic Names

The adjacent area north of the Juniata River Basin is drained by the West Branch Susquehanna River, that to the south by the Susquehanna and the Potomac Rivers while the region adjacent on the west lies within the Ohio River Basin.

Elevations in the Basin range from an altitude of 3136 feet at Blue Knob in the western part of Blair County to 334 feet at Duncannon. Numerous ridges stand at altitudes of 2300 to 2600 feet above sea level and 600 to 1800 feet above the adjacent valleys.

The area is a region of alternating hard and soft sedimentary rocks. The softer rocks have been eroded forming valleys and the more resistant rocks stand out as long, narrow, even crested ridges. The higher areas are shale and sandstone formations and the valleys are largely limestone areas. Iron ores are found throughout the Basin and semi-bituminous coal is found in the Broad Top coal field in the south-western part of the Basin.

The climate of the Basin is temperate. The mean annual temperature is about 50°. Maximum temperatures of 90° or higher are recorded on an average of 10 days during the summer, while the average number of days with freezing temperatures is over 100 with minimum temperatures of 20° to 25° below zero not uncommon. The prevailing winds are west and north-west but the mountain and valley influence on the air movements cause great variations in temperature.

The annual precipitation in the Basin averages about 40 inches and varies from about 36 inches in the southwestern section to 42 inches at the eastern end of the Basin. The mountain ridges have a pronounced effect on summer showers and thunderstorms are often shunted up the valleys. Precipitation is fairly well distributed throughout the year with the heaviest rainfall occuring during May to August when it is of most benefit to crops and low rainfall occuring in October, November and February. The average annual snowfall ranges from 36 to 52 inches and varies considerably within short distances. Annual precipitation was greatest during the years 1889-90 and 1932-33 being 53.29 inches and 51.34 inches for the State. The driest year on record in the State was 1931-32 when the precipitation was 32.97 inches.

In the Juniata Basin there are 29 recording and 20 non-recording hydrologic stations. The recording stations consist of 12 precipitation and 17 rated river gages. The non-recording consist of nine precipitation, four precipitation and temperature, two complete meteorological and five river gage stations for stage only.

The stream flows for the year ending September 30, 1929 closely approximated a year of normal run-off in the Basin. At Newport, where the Juniata River drains about 98.7% of the entire Juniata River Basin, the run-off of 13.76 inches was approximately 38.2% of the precipitation. This run-off produced during that year an average daily stream flow of 3430 cubic feet per second, which is equivalent to 1.01 cubic feet per second per square mile of area drained. During the year the minimum daily flow was 400 cubic feet per second and the maximum 41,700 cubic feet per second.

A detailed description of the main streams in the Basin appears in Appendix A. Occasional flood and drought conditions have been encountered.

There are several large springs and underground streams in the limestone and dolomite formations. However, the ground water obtained from shallow wells and springs is generally derived from precipitation in the immediate vicinity and water from the deeper wells from precipitation in the general vicinity, usually within the same or adjacent county.

ECONOMIC DEVELOPMENT

The estimated population of the Juniata River Basin, based upon the 1950 Census of Population, is 287,400 which shows a decrease of approximately 1,000 since 1940 or a loss of 0.3%. During the same period, there was a gain of 6.0% in the population of Pennsylvania. The Basin has an average density of population of 84 to the square mile as compared with 234 for the entire State. The Basin includes 82 townships wholly within the Basin, 40 partially in the area, 50 boroughs and one city. Approximately 54% of the population reside in the incorporated municipalities. Distribution of the estimated population is shown in the following table:

Juniata River Basin
Estimated Population in Basin

		1940	1950
Townships	122 (40)*	131,824	133,391
Boroughs	50	76,522	76,812
City	1	80,214	77,177
TOTAL		288,560	287,380

* 40 townships partially within the Basin

Altoona, in Blair County, the only city within the Basin, had a decrease in population of 3.8% from 80,214 in 1940 to 77,177 in 1950. The Borough of Lewistown has a population of 13,894, a gain of approximately 7% since 1940. Hollidaysburg and Huntingdon in the 5000 - 10,000 population group, had increases of 9.7% and 2.2%, respectively, while Tyrone in the same group had a decrease of 7.1%. There are 12 boroughs in the 1000-5000 population group, three of which had increases and nine decreases. Thrity-four boroughs have populations of less than 1000. The populations of the Counties and the incorporated municipalities are shown in Appendix B.

Important industrial centers are the City of Altoona and the Boroughs of Burnham, Hollidaysburg, Huntingdon, Lewistown, Tyrone and Williamsburg. The principal classes of manufacturing industries

and the value* of production in 1945 within the five counties principally within the Basin are as follows:

Manufacturing Industry	Value of Production
Metal and metal products	$ 61,847,000
Textile and textile products	36,165,000
Paper and printing	17,022,000
Food and kindred products	13,260,000
Lumber products	964,000
	$ 129,258,000

In 1947, the latest year of record, there were 310 manufacturing establishments within the five county area which employed about 21,000 persons. Salaries and wages paid amounted to approximately $50,000,000 and the value added to products through manufacturing was about $83,000,000.

In 1939, there were 75 companies** operating 82 mines or quarries and 30 preparation plants within the counties of Bedford, Blair, Huntingdon and Mifflin. These employed some 2700 persons, paid wages and salaries of about $2,808,000 and produced mineral products valued at approximately $5,238,000. About 50% of the operations produced bituminous coal, 25% produced limestone, 15% sandstone and the others produced glass sand, fire clay and common sand and gravel.

The bituminous coal deposits in the Broad Top field at the junction of Bedford, Fulton and Huntingdon Counties have been mined for more than 100 years, but large reserves remain to be mined.

* County Statistical Summary - Eleventh Industrial Directory
Pennsylvania Department of Internal Affairs, 1947

** Mineral Industries 1939 - U.S. Department of Commerce

About 62% of the Juniata River Basin is forest land. The State owns approximately 12% of the forest land. Most of the existing forest growth is second growth timber. The forest land in the various counties as of January 1, 1947 is shown in the following table:*

County	Area (Acres)	Total Forest Land	Forest Land Not State Forest	State Forest Land
Bedford	651,520	385,449	366,997	18,452
Blair	339,200	198,783	198,783	-
Fulton	278,400	162,534	132,392	30,142
Huntingdon	572,800	416,372	351,652	64,720
Juniata	247,680	135,097	126,120	8,977
Mifflin	275,840	174,963	121,809	53,152
Perry	352,000	209,616	177,123	32,491
	2,717,440	1,682,814	1,474,876	207,934

The lumbering industry, a leading industry at one time, reached its peak about 1900 and is no longer conducted on an important scale. Data available** indicates the production of lumber in 1945 within four counties as follows:

County	Number of Mills	Lumber Sawed in Thousands of feet Board Measure
Bedford	73	16,885
Huntingdon	64	18,626
Juniata	22	4,030
Mifflin	24	3,806
	183	43,347

The principal agricultural development is found in the broad and fertile limestone valleys throughout the Basin. General farming predominates, the principal crops being corn, wheat and oats, although there is considerable fruit, poultry and dairy farming.

* The Pennsylvania Manual 1947 - 1948
** Forest Products 1945 - Bureau of Census, Industry Division, U. S. Department of Commerce

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In 1945, there were 9744 farms within the five counties mainly in the Basin. These contained about 525,600 acres in cropland or about 25% of the Basin area. The cropland under cultivation or fallow comprised about 87.8% of the total cropland. Between 1940 and 1945 the number of farms increased by 5.9%, the cropland under cultivation increased by 6.9%, but the long time decline in the use of land for agricultural purposes continued, there being a decrease of 2% in the total cropland. The decline in land utilization for agriculture is probably due to the return of sub-marginal farms to forest growth, the increase of urban development, the expansion of game and forest preserves and the increased cost of production on depleted lands. The value of crops harvested in 1945 was about $14,905,000 and livestock and livestock products about $14,750,000 which was approximately twice the value of the 1940 production.

Soil erosion is a problem in many of the valleys within the Juniata River Basin. A large proportion of these is subject to moderate sheet or gulley erosion. Areas subject to severe erosion are in the vicinity of Petersburg, Mapleton, Orbisonia, Newton, Hamilton and Mifflintown* and in an area southwest of Huntingdon.

Within the Juniata River Basin, there are more than 150,000 acres of State Forest Land, five State Parks occupying more than 10,000 acres, and 11 State Forest Picnic Areas. The State Parks are as follows:

County	State Park	Area (Acres)
Bedford	Blue Knob	5338
Bedford	Shawnee	3100 (Lake 460 Acres)
Fulton	Cowans Gap	1346 (Lake 42 Acres)
Huntingdon	Greenwood Furnace	- (Lake 3 Acres)
Huntingdon	Whipple Dam	262

The State Parks have well developed recreational facilities for camping, picnics, organized group camps, hiking. swimming, boating and fishing. Within the State Forests there are also 11 developed picnic areas, two with bathing beaches, and numerous game refuges.

In 1950, within the counties of Bedford, Blair, Huntingdon, Juniata and Mifflin, there were tourist accommodations comprising 64 cabin groups, five trailer camps and 24 parks, and 21 commercial or organization camps.**

The entire Juniata River Basin is served by a network of modern highways which connect the population centers. The principal East-West highways are the William Penn Highway (U.S. 22) which follows the

* Conservation, Pennsylvania State Planning Board, 1945
** Pennsylvania Department of Health, Division of Environmental Hygiene

Juniata River and the Lincoln Highway (U.S. 30) which crosses the southern portion of the Basin over mountainous country and roughly parallels the Pennsylvania Turnpike, a section of which extends about 64 miles from the Tuscarora Tunnel in Fulton County, across Bedford County, to the Allegheny Tunnel in Somerset County. The principal interconnecting North-South highways are U.S. 522 and U.S. 220. The five counties mainly within the Basin contain more than 2000 miles of improved highways.

The Basin is crossed by the main line of the Pennsylvania Railroad parelleling the Juniata River from its mouth to the boundary of the Basin near Cresson. The Huntingdon and Broad Top Mountain Railroad and Coal Company serves the area between Huntingdon and Bedford, and the East Broad Top Railroad and Coal Company operates between Mount Union, Orbisonia and the Broad Top Coal Field. Fulton County is the only county in the Basin without a railroad, except for a coal spur across its northwest corner.

There are 15 licensed airports within the Basin, 12 commercial and three privately operated. Altoona is served by the All American Airways.

There is no system of waterway transportation. The canals paralleling the Juniata which were extensively developed in the 19th Century were abandoned prior to 1900.

PRESENT AND FUTURE USES OF WATER RESOURCES

The principal water uses recognized by the Clean Streams law of Pennsylvania are for domestic water supply, animal or aquatic life, industrial consumption and recreational purposes. In order to protect and improve the quality of the water in the streams for the recognized uses, the Sanitary Water Board has classified the streams and specified the degree of treatment to be given to waste waters before discharge into the streams. The streams in the Juniata River Basin have been classified as substantially clean streams with "complete" treatment of waste waters required before discharge into the streams.

Water for domestic and industrial use in the Basin is taken from both surface and underground sources. The majority of the communities are supplied with water from impoundments on upland streams or from walls and springs. Public water supplies are served to 65 communities by 21 municipally owned and 35 privately owned plants. In 1949, these plants served approximately 104,400 persons, the municipal plants taking care of 88% of the population served. An additional community will be served by a public water supply system now under construction.

Total daily water consumption of all public supplies amounts to about 19,145,000 gallons of which 8.2% is filtered, 85.4% chlorinated and 6.4% supplied without treatment. Of the 104,400 persons served by community supplies, 7.1% are served filtered water, 83.7% are served chlorinated supplies and 9.2% are served supplies which receive no

treatment. Surface water supplies are served without chlorination to an aggregate population of 11,365 in six communities. Public water supplies, obtained exclusively from wells and springs are served to about 13,500 persons in 30 communities, the daily consumption amounting to 1,154,000 gallons of which 877,000 gallons are chlorinated and served to 7,950 persons. Data on public water supplies are shown in Appendix C.

Most of the ground waters are satisfactory for ordinary use but some from the limestone regions are generally too hard for most purposes but are satisfactory for cooling or drinking.

The rural areas and small villages use ground water extensively for domestic and stock watering purposes. Supplies are obtained from the numerous springs and dug wells.

Considerable ground water for industrial use is obtained from the larger springs and drilled wells. The larger springs yield hard clear water in amounts varying from 2000 to 5000 gallons per minute and are generally owned by and supply the paper and refractory industries. The spring at Spring Meadows in Bedford County supplies the Reynoldsdale State Fish Hatchery. The supplies obtained from drilled wells are also used by the pulp and paper mills, iron and steel mills, meat packing plants and dairies.

Surface streams serve as sources of industrial water supply for all the sand and stone washery operations which individually use from two to four million gallons per day. The American Viscose Company plant at Lewistown obtains from 3 1/2 to 5 million gallons per day from the Juniata River and a portion of the industrial supplies at the Williamsburg and Tyrone plants of the West Virginia Pulp and Paper Company are obtained from surface streams.

The Pennsylvania Edison Company operates two hydro-electric power plants in the Basin. One plant is on the Juniata River at Warrior Ridge, about 2 1/2 miles below the mouth of the Little Juniata River, and the other is on the Raystown Branch at Hauns Bridge about nine miles upstream from the Juniata River. The intermittent operation of these power stations with the release of impounded water from the pools above the dams results in wide fluctuations of stream flows several times daily. The stream flows between the discharges from the power dams approach drought flow conditions in the upper reaches of the Juniata River and the fluctuations in flow, though not as marked, extend downstream for about 75 miles. The frequent and wide fluctuations in flows adversely affect the use of the stream for recreational purposes and aquatic life. Likewise, these fluctuations adversely affect the ability of the stream to recover from pollution.

The Pennsylvania Central Light and Power Company operates a low dam on the Raystown Branch at Saxton about 34 miles upstream from Hauns Bridge. Water is used for steam purposes in the company's electric power plant.

Numerous streams throughout the Juniata River Basin provide excellent fishing. The Pennsylvania Fish Commission maintains a program of restocking the heavily-fished streams. The State fish hatchery at

Reynoldsdale helps to support this program through which 600 miles of streams and seven lakes or dams covering 718 acres within the Basin are restocked with brook, brown and rainbow trout and black bass. There is also considerable fishing in the warm water streams including the Juniata River and the Raystown Branch which provide black bass, pickerel, wall-eyed pike, sunfish, catfish and suckers. The sport of game fishing is increasing yearly in the area as shown by the number of resident citizen's fishing licenses which increased from 16,907 in 1945 to 24,921 in 1949 in the five counties mainly within the Basin and in the latter year provided an income of about $50,000 in license fees. Data are not available to determine the breakdown by counties of the 7,431 non-resident and tourist fishing licenses issued in 1949 or the 2,571 free licenses issued to persons in military service.*

Clean waters are also necessary for propagation of wildlife. Within the Juniata River Basin the Pennsylvania Game Commission operates some 97,000 acres of State Game Land and approximately 20,000 acres in Cooperative Farm Game projects and other auxiliary projects. All game refuges are surrounded by public hunting grounds and the major portion of the State Game Lands and much of the State Forest Lands are open to public hunting.**

Many of the streams are widely used as summer camping sites and for boating and fishing by individuals and organized groups. In 1950, there were 19 organization and two commercial camps which served a population of 2,853.

Within the basin there are 14 bathing places which use streams or springs as sources of bathing water supply and which operate under permits issued by the State Health Department. These consist of seven beaches and one swimming pool within the State Parks, one commercial beach, two commercial pools, two organization group pools and one municipal park pool.

The existing primary water uses and stream status are shown on Map No. 1.

POLLUTION CONTRIBUTED TO WATER RESOURCES

A summary of available data indicates there are 28 municipal sewer systems in the Juniata River Basin serving a population of 148,400 or about 52% of the estimated population of the Basin. These systems discharge to the streams a pollution load equivalent to that from a population of 108,800 (Table A), the overall reduction of about 27% being accomplished through the operation of eight municipal sewage treatment plants which serve a total population of 94,900.

Wastes from 15 sources of pollution contributed by 14 industrial establishments are discharged directly to the streams. These establishments consist of seven which produce organic wastes and include two which also produce inorganic wastes (Table B). Data concerning the population

* Pennsylvania Fish Commission - Biennial Report 1950 - Major Trout and Bass Waters.

** Pennsylvania Game Commission - Biennial Report 1947-1948

equivalent of the industrial waste discharges are not available in most cases. There are also 21 probable additional sources of pollution as indicated by a recent survey of slaughterhouses and dairies throughout the Basin.

TABLE A

JUNIATA RIVER BASIN

Source of Pollution

Municipal

May 1951

Municipalities*	Sources of Pollution (In Number of Municipalities	Population Served by Sewerage Systems	Amount of Pollution Discharged to Watercourse (In Terms of Equivalent Number of People)**
Having data on pollution load discharged to watercourse	28	148,400	108,800
Having population data available (Data on pollution load to watercourse incomplete or not available)	-	-	Undetermined
	28	148,400	xxx xxx

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

** Includes industrial wastes discharged into municipal sewerage systems.

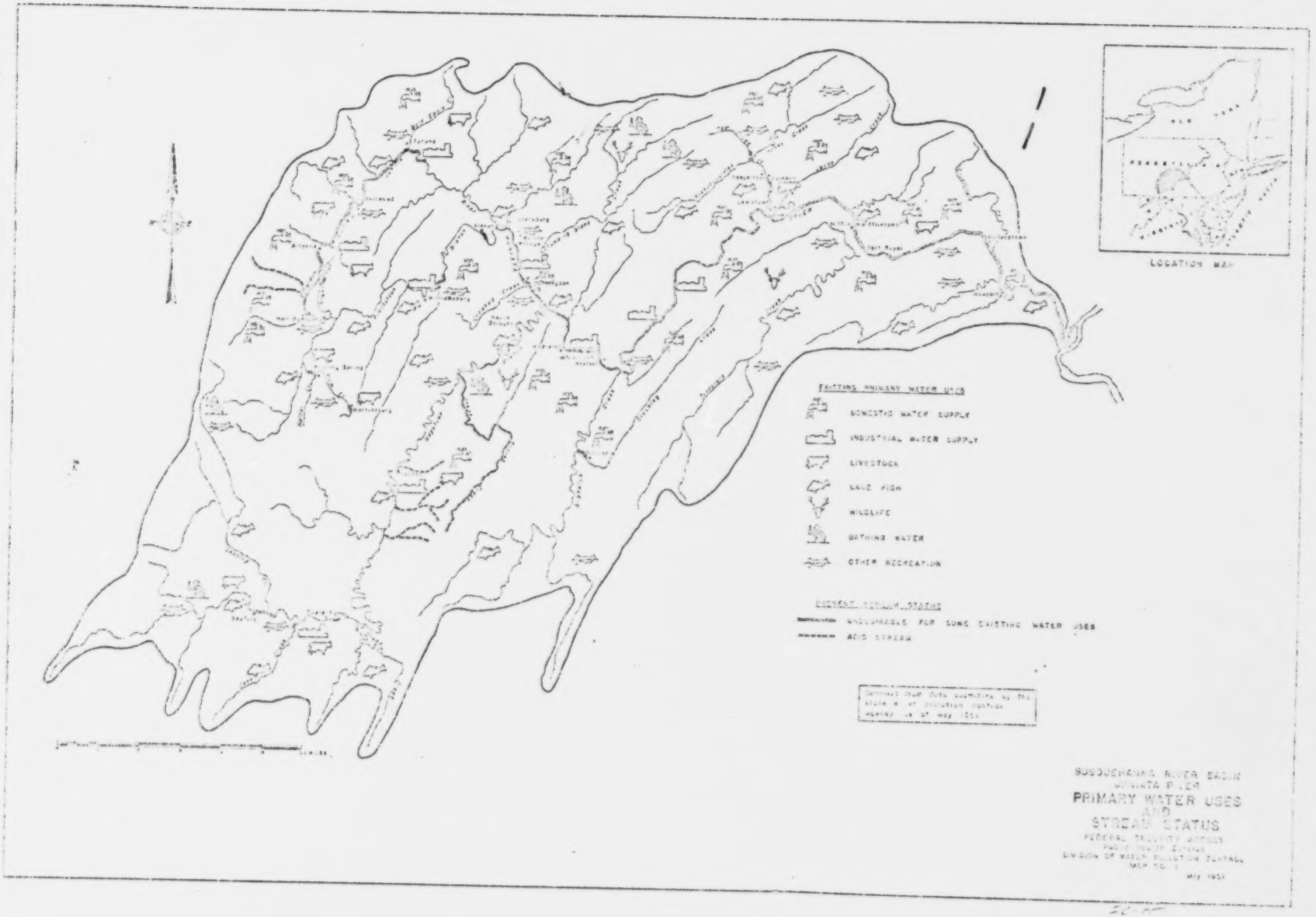

LOCATION MAP
EXISTING PRIMARY WATER USES
DOMESTIC WATER SUPPLY
INDUSTRIAL WATER SUPPLY
LIVESTOCK
SALE FISH
WILDLIFE
BATHING WATER
OTHER RECREATION
PRESENT STREAM STATUS
UNSUITABLE FOR SOME EXISTING WATER USES
ACID STREAM
SUSQUEHANNA RIVER BASIN
SUSQUEHANNA R.,PA.
PRIMARY WATER USES
AND
STREAM STATUS
FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL
MAY 1951

TABLE B

JUNIATA RIVER BASIN

Sources of Pollution

Industrial

May 1951

Industries*	Sources of Pollution (In No. of Plants)	Amount of Pollution Discharged to Watercourse (In terms of Equivalent Number of People(a)
Producing Organic Wastes	1	20,000
Producing Organic Wastes	6**	Undetermined
Producing Inorganic Wastes	9	Not Applicable
Producing Wastes of Undetermined Type	-	Undetermined
TOTAL:	14***	xxxxx

* Industries having separate outlets discharging wastes directly to watercourse.

** Includes two plants also producing inorganic wastes.

*** Total adjusted to correct for duplication noted in footnote marked thus, **.

(a) Equivalent Population - The calculated population which would normally contribute the same amount of biochemical oxygen demand (B.O.D.) per day. A common base is 0.167 lb. of 5-day B.O.D. per capita per day.

NOTE: Information on bituminous coal mining not available.
Table does not include probable 21 additional sources indicated by recent survey of slaughter houses and dairies.

The main stem of the Juniata River receives direct discharges of municipal pollution from 13 sources, or about 46% of the municipal sources in the Basin. These sources, one of which receives inadequate treatment, serve a total population of 36,000 and discharge a pollution load having a population equivalent of 35,500 or 33% of the total municipal pollution in the Juniata River Basin. The principal sources of municipal pollution to the main stem Juniata are discharges of untreated sewage in the vicinity of Huntingdon Borough from Smithfield Township, the Pennsylvania Industrial School and the borough which serve a total population of 11,000, from the Mapleton-Mount Union Area with a population of 4400, Lewistown, population 14,000, the Mifflintown, Mifflin, Port Royal Area with a population of 1,900 and at Newport from a population of 2,000.

The Little Juniata River receives pollution from three municipal systems or about 11% of the sources in the Basin. These systems, two with sewage treatment plants, serve a total population of 48,700 and discharge a pollution load having a population equivalent of 32,400 or 30% of the municipal pollution load in the Basin. The principal sources of pollution are the Altoona (East Plant) which discharges inadequately treated sewage having a population equivalent of 23,000 and the discharge of untreated sewage from a population of 9,900 in Tyrone.

The Frankstown Branch and its tributaries receive pollution from seven municipal systems or 25% of the municipal sources in the Basin. These municipal systems, five with sewage treatment plants, serve a total population of 54,300 and discharge pollution equivalent to that from a population of 31,500 or 29% of the municipal pollution load discharged to all the streams in the Basin. The principal source of pollution is the Altoona West Plant which discharges inadequately treated sewage with a population equivalent of 26,700 into the headwaters of Beaver Dam Branch.

The Raystown Branch receives pollution from the discharge of untreated sewage from Bedford, Everett and Saxton from a total population of 6,900 or 6% of the municipal pollution in the Basin. The remaining 2% of the municipal pollution is from two municipalities without treatment facilities, Orbisonia with discharges into Blacklog Creek, a tributary of Aughwick Creek, from a population of 500, and Burnham with discharges into Kishacoquillas Creek from a population of 2,000.

Wastes from 15 sources of pollution contributed by 14 industrial establishments are discharged directly to the streams in the Juniata River Basin. However, industrial waste treatment facilities are provided at 10 of these establishments, one of which also has a separate plant for the treatment of sewage. The 15 sources of pollution consist of six discharging organic wastes, two discharging organic and inorganic wastes, and seven discharging inorganic wastes.

The Little Juniata River, receives the treated wastes from the Pennsylvania Railroad Company Altoona shops and approximately 4 1/2 M.G.D. discharged into Bald Eagle Creek from the treatment facilities at the Tyrone plant of the West Virginia Pulp and Paper Company. The Frankstown Branch near its headwaters receives treated wastes discharged from the Green Giant Company into Plum Creek and untreated wastes discharged into

Halter Creek from the D.K. Bare Paper Company in Roaring Spring and approximately 700 g.p.m. from the New Enterprise Stone and Lime Company operation. About 21 miles downstream from Roaring Spring the Frankstown Branch receives approximately 4 1/4 M.G.D. of waste waters discharged after treatment at the Williamsburg plant of the West Virginia Pulp and Paper Company, Crooked Creek, tributary to the Juniata River at Huntingdon, receives the treated waste waters discharged from the plant of the New Enterprise Stone and Lime Company in Walker Township, Huntingdon County.

The main stem of the Juniata River receives industrial waste discharges from three sand processing plants, two operated by the Pennsylvania Glass Sand Corporation in the vicinity of Mapleton and about 16 miles downstream in Wayne Township, Mifflin County, and a third plant 9.5 miles further downstream operated by the Mifflin Sand Company in Bratton Township, Mifflin County. At Lewistown, the Juniata receives the effluent from the sewage treatment plant of the American Viscose Company and also its partially treated industrial waste waters of approximately 2,000,000 gallons per day.

Other discharges of industrial waste waters within the Basin are into the Raystown Branch from the waste treatment facilities of the New Enterprise Stone and Lime Company plant at the mouth of Cove Creek about three miles upstream from Everett, untreated waste waters discharged from the vegetable cannery of the Mifflin Packing Company into Tea Creek, a tributary of Kishacoquillas Creek and the treated waste waters discharged into Kishacoquillas Creek from the plant of the Miller Silica Sand Company just below Burnham.

A field survey of slaughter houses and minor dairy establishments within the Basin has been completed recently by the Pennsylvania Department of Health. Approximately 56 slaughterhouses and 62 dairy establishments were surveyed. A preliminary review of data collected indicates that 10 slaughterhouses and 11 dairy plants are discharging waste waters to the streams. Steps will be taken by the Pennsylvania Sanitary Water Board to extend the pollution control program to these establishments.

There are about 60 miles of acid polluted streams, with a pH value of 5.5 or less, in the Juniata Basin resulting from the discharge of acid mine drainage from bituminous coal operations. In 1942, it was estimated that mine drainage discharged to streams in the Basin produced an acid load of 180 tons per day or about 6.4% of the total acid mine load discharged to the streams from bituminous coal operations in Pennsylvania.* The coal mining operations are confined principally to the southwestern portion of the Basin. The 1945 Amendment to the Clean Streams law provides for the submission of plans of drainage and disposal of industrial wastes for approval in the case of mines in operation since prior to May 8, 1945 and the issuance of permits for new mines or those reopened since May 8, 1945. The Sanitary Water Board has received applica-

* Pollution By and Control of Acid Mine Drainage in Pennsylvania
L.S. Morgan, Pennsylvania Department of Health. June, 1950

tions for permits to discharge drainage from 20 new or reopened strip mines and 14 deep mines in the area and for discharges from seven strip mines and 44 deep mines which were in operation prior to 1945.

Map No. 2 shows the sources of pollution and existing treatment facilities but does not include data on acid mine drainage.

DAMAGES TO WATER RESOURCES FROM POLLUTION

In the Juniata River Basin, there are sources of gross local pollution which adversely affect the streams for some distance below these sources.

Public water supplies are obtained from ground water sources or upland streams with the exception of Huntingdon and Newport which operate filtration plants, the former using Standing Stone Creek and the latter the Juniata River as sources of supply.

The pollution discharged to the streams can present a potential danger to public health such as existed in the Basin during the low flows or drought conditions in 1930-1931 when there was a lack of sufficient flow to provide adequate dilution of the pollution. Under such conditions, excessive demands are also placed upon the normal water treatment facilities to assure a safe supply.

The hydro-electric plants, the washery and processing operations of the sand and stone companies and the American Viscose plant at Lewistown are subject to adverse effects from pollution of the streams serving as sources of industrial water supply. Damage to condensers and boilers results. The sand and stone companies are required to provide additional screening and pumpage to obtain adequate processing water and considerable treatment of the supply is necessary before it can be used in the manufacturing processes of the Viscose Company.

Discharges of acid mine drainage has caused the discoloration of the water, created sludge deposits in the receiving streams and destroyed fish and wiped out aquatic life essential for fish survival. Damage to the streams does not end at the point where dilution makes aquatic life possible, but continues to lower the productive capacity of many more miles of stream.

Discharges of untreated industrial wastes and the escape of partially treated wastes from impoundments or lagoons have resulted in the streams being discolored and covered with foam, and have caused numerous fish killings, some of which were of major proportions. These discharges have also rendered sections of the streams unsatisfactory for recreational purposes.

Only a portion of the Juniata Watershed area is within organized soil conservation districts. Data are not available concerning the silt deposited in the streams as the result of soil erosion. A measure of the soil loss can be found from a summary of soil conservation surveys in a part of Fulton County which is just outside of this drainage Basin,

LOCATION MAP

SUSQUEHANNA RIVER BASIN
STUDY

SOURCES OF POLLUTION
AND
EXISTING TREATMENT FACILITIES

FEDERAL WATER POLLUTION CONTROL
ADMINISTRATION
NORTH ATLANTIC REGION
DIVISION OF WATER POLLUTION SURVEILLANCE
MAP NO. 2
MAY 1967

27 47

but on similar land. In the limestone valleys, the cropland and pasture land lost on the average more than five inches of the original eight or nine inches of topsoil and where the land has been cleared and used and then allowed to remain idle, practically all of the topsoil has been lost. On the shale valleys and hills, erosion has been even more serious and an average of six inches has been lost from the original eight inches of soil. The sandstone mountain areas and barrens have mostly remained in wood land with slight or no erosion. Much of the soil indicated as lost from the original surface has not reached the streams, but is lodged on lower slopes and along the stream valleys. However, on the basis of its erosion indices and the results of special sedimentation studies in other watersheds in the Northeast, the Soil Conservation Service of the U.S. Department of Agriculture estimated that the amount of sediment reaching the main channel of the Juniata River would be about 500,000 to 600,000 tons per year of which a considerable portion will move out into the Susquehanna River.

BENEFITS RESULTING FROM POLLUTION PREVENTION AND ABATEMENT

The program of the Sanitary Water Board to prevent and abate pollution in the Juniata River Basin, will eliminate the local sources of pollution and render the streams generally clean and suitable for domestic water supply, animal or aquatic life, industrial consumption and recreational purposes. However, the cleaning up of the pollution from acid mine drainage must await the development of a practical means for treating such drainage. Improvements scheduled will remove potential local health hazards resulting from the discharge of untreated or inadequately treated sewage or industrial wastes, improve the quality of water available for industrial use, improve the recreational facilities available, and remove materials which are toxic to fish life and in other cases, materials which create sludge banks and wipe out aquatic life essential for fish survival.

Stream pollution abatement provides a saving in the cost of processing the surface supplies used for manufacturing purposes, reduces the cost in maintenance and replacement of plant equipment and in some cases, results in a direct profit to industry through the recovery of materials from process changes or recovery through waste treatment methods.

The West Virginia Pulp and Paper Company which manufactures pulp by the soda process and paper at its Tyrone Plant, recovers soda and a granular carbon by evaporating, charring and leaching the spent soda mill wastes. The soda is reused and the granular carbon or "black ash" is cleaned and further treated by superheated steam in drums to form a very adsorptive material known as activated carbon which is widely used for removal of tastes, odors and colors in water treatment plants and industrial processes.

Untreated or inadequately treated wastes from canneries produce a high degree of stream pollution which can be eliminated by collecting and pumping the waste waters to the fields for irrigation purposes or by accumulation in lagoons for use as fertilizer.

The reduction of pollution from abbatoirs provides a small financial

return for the small plants through the collection and sale of blood and other wastes.

In the Juniata River Basin the public health hazard has been decreased through the operation of eight sewage treatment plants. Additional improvement will be provided upon the completion of the two plants now under construction at Altoona.

The waste treatment facilities installed by the industries along with changes made in plant equipment to remove objectionable wastes have reduced the industrial waste pollution load discharged to the streams by about 48%. This reduction has resulted in a decided improvement of the streams, particularly in those sections below the paper, chemical, and the sand preparation plants, where previously the industrial discharges caused foaming, discoloration and increased turbidity which in some cases extended several miles downstream.

The operation of the municipal and industrial waste treatment plants has improved the quality of stream water available for industrial use and has increased the recreational value of the water resources in the Basin.

POLLUTION PREVENTION MEASURES IN EFFECT

In the Juniata River Basin, facilities are provided for treating the wastes from eight municipal sewer systems or about 29% of the municipal systems in the Basin. These facilities serve a population of 94,900 or about 64% of the estimated sewered population in the Basin. About 55% of the sewered population is served by four primary treatment plants; 9% with secondary treatment. No treatment facilities are provided for 53,500, or 36% of the sewered population discharging pollution to the streams from 20 municipal sources.

Municipalities with primary sewage treatment facilities are Granville Township in Mifflin County, Altoona East and West plants, and Bellwood. Secondary treatment plants are located at Williamsburg, Martinsburg, Roaring Spring and Hollidaysburg.

TABLE C

JUNIATA RIVER BASIN

Existing Treatment Facilities

Municipal

May 1951

Degree of Treatment Provided	Number of Municipalities* Served	Number of Treatment Plants	Population Served
Primary	4	4	82,200
Secondary	4	4	12,700
No Treatment	20	-	53,500
TOTAL	28	8	148,400

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

Ten of the industrial establishments are served by 11 treatment facilities, one of which consists of a separate sewage treatment plant. No waste treatment facilities are provided at four establishments. It is to be noted that seven establishments which are listed as "other mining" comprise 47% of the sources of pollution. These seven establishments which are related to sand and stone operations produce inorganic wastes. Treatment facilities are provided at five of them for removing the settleable material before discharging the effluent to the streams. The major sources of industrial organic pollution on the Frankstown Branch and its tributaries are the Williamsburg plant of the West Virginia Pulp and Paper Company and the D.M. Bare Paper Company in Roaring Spring. Primary treatment facilities are provided at the Williamsburg plant where treatment is given to waste waters amounting to about 4,250,000 gallons per day. The construction of facilities for treating waste waters are approximately 75% complete at the D.M. Bare Company plant in Roaring Spring.

The principal industrial organic pollution received by the Little Juniata River is from the Tyrone plant of the West Virginia Pulp and Paper Company where 4,500,000 gallons per day of waste waters are given primary treatment before discharge into Bald Eagle Creek, a tributary near the mouth of the Little Juniata River.

On the main stem Juniata River the principal source of industrial pollution is the American Viscose Corporation plant across the river from Lewistown. Sewage is treated in a separate treatment works. Plans

for additions to provide complete treatment have been approved. Plans have also been approved for works to replace the existing industrial waste treatment facilities.

TABLE D

JUNIATA RIVER BASIN

Existing Treatment Facilities

Industrial*

May 1951

Type Industry	No. of Plants	Treatment Facilities	No Treatment Facilities	Undetermined Facilities
Food and Kindred	2(a)	1	1	-
Chem.& Allied	1	2**	-	-
Paper & Allied	3	2	1	-
Other Mining	7	5	2	-
Miscellaneous	1	1	-	-
TOTAL	14	11**	4	-

* Industries having separate outlets discharging wastes directly to watercourse.

** Includes one sewage treatment plant at an industrial establishment.

(a) Canneries

Note: Information on bituminous coal mining not available.

Four of the existing eight municipal sewage treatment plants are considered to be of adequate capacity to provide the degree of treatment required and are operated in a satisfactory manner. These four plants serve Hollidaysburg, Martinsburg, Roaring Spring and Williamsburg with a combined population of 12,700 or 13% of those served with treatment facilities in the Basin.

The primary treatment plants which serve Granville Township in Mifflin County and Bellwood, Blair County are operated satisfactorily but are inadequate to provide the degree of treatment required.

New plants are under construction in the City of Altoona to replace the existing West plant (screening-irrigation) and the inadequate East plant, which together serve a total population of 78,000.

TABLE E

JUNIATA RIVER BASIN

Adequacy of Existing Treatment Facilities

Municipal*

May 1951

Number of Municipal* Treatment Facilities	Adequacy with Relation to: Capacity			Operation		
	Satisf.	Unsatisf.	Undetermined	Satisf.	Unsatisf.	Undetermined
Plants 8	4	4	-	6	2	-
Population Served 94,900	12,700	82,200	-	16,900	78,000	

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

In most cases, data are not available concerning the population equivalent of the industrial wastes discharged to the streams. However, general information available indicate that five of the existing industrial waste treatment works provide the required degree of treatment and are operated satisfactorily. Six of the existing treatment plants are not of adequate capacity to provide the degree of treatment required although the operation of four of these plants, including a separate sewage treatment plant, is satisfactory.

TABLE F

JUNIATA RIVER BASIN

Adequacy of Existing Treatment Facilities

Industrial*

May 1951

Number of Industrial* Treatment Facilities	Adequacy with Relation to: Capacity			Operation		
	Satisf.	Unsatisf.	Undetermined	Satisf.	Unsatisf.	Undetermined
11**	5	6**	-	9**	2	-

* Industries having separate outlets discharging wastes directly to watercourse.

** Includes a sewage treatment plant at an industrial establishment.

No new sewage treatment plants were constructed and placed in operation in the Juniata River Basin in the years 1946 to 1950 inclusive. However, two projects are now under construction in the City of Altoona. Under the first stage of the program, which will require four years for completion, the City Sewer Authority on June 29, 1950 awarded five contracts totalling $782,000 for construction of the primary treatment facilities at the East Plant to be completed during the summer of 1951. Work has also been started on construction of the outfall sewer from the West Plant. The City Sewer Authority sold an issue of 30 year revenue bonds amounting to $1,400,000 at an average interest rate of 2.64%, the bonds to be amortized through sewer rentals. Subsequently, the Authority awarded additional contracts totalling $730,732 for the outfall sewer from the West Plant and the secondary treatment facilities at the East Plant and sold an issue of 28 year revenue bonds amounting to $300,000 at an interest rate of 2 1/2%.

Jurisdiction of all matters pertaining to stream pollution in Pennsylvania is under the Sanitary Water Board, an agency within the Department of Health. The Bureau of Engineering of the Department is the investigating, examining, reporting and enforcement agent of the Board. The personnel of the Board consists of the Secretary of Health, Chairman; Secretary of Forests and Waters, Secretary of Mines, the Executive Director of the Pennsylvania Fish Commission, and three others appointed by the Governor and confirmed by the Senate. Close cooperation between the departments is evident in carrying out the stream clean-up program. A study of the effects of industrial wastes upon fish life is underway at the Pleasant Gap Fish Hatchery near Bellefonte and the regular fish wardens of the Pennsylvania Fish Commission have also been designated as deputy field agents of the Sanitary Water Board.

The Pennsylvania Sanitary Water Board is conducting its program for stream cleanup in two phases. The first phase, which involves the preparation of plans for treatment works, is practically complete in the Juniata River Basin as it concerns municipal sources of pollution. The Board acting under the Pennsylvania Anti-Pollution Act of 1937, as amended in 1945, has issued orders to municipalities and industries which are polluting the waters of the State to abate the discharges of such pollution or submit plans of corrective measures for approval.

The streams in the Juniata River Basin have been classified by the Sanitary Water Board as substantially clean streams and the Board's orders specify the period for compliance and set forth that "complete" treatment of sewage and an equivalent treatment of industrial wastes will be acceptable for treated effluents to the streams in the Basin.

"Complete" treatment of sewage is such treatment as in the opinion of the Pennsylvania Sanitary Water Board, will remove practically all of the suspended solids; will remove at least eighty five percent of the organic pollution load as measured by the Biochemical Oxygen Demand test; will provide effective disinfection to control disease-producing germs; will provide satisfactory disposal of sludge; and will produce a final effluent that is suitable for discharge into the receiving stream. It is further required that treatment shall include the removal of oils, greases, acids, alkalis, toxic, putrescible, taste and odor producing substances and other substances inimical to the public interest in the receiving stream.

Specific standards have been adopted for certain industrial wastes including milk processing wastes, colliery silt, acid pickling waste waters, wastes arising from the manufacture of pulp, paper, paper board and similar products, oil and natural gas wells, wastes from other wells, phenolic bodies, oil-bearing wastes, distillery wastes, tannery waste waters and mine drainage. The discharge of cyanides to the waters of the State is prohibited. In general, the standards set forth values representative of standard raw waste characteristics which serve as the basis upon which the required degree of treatment is applied.

Research projects, sponsored by the Sanitary Water Board, seeking a solution of the problem of stream pollution from acid mine drainage from coal operations have been underway for several years at the Mellon Institute in Pittsburgh.

The Board also sponsored a study of wastes from small slaughter houses recently completed by the Pennsylvania State College. The results of this study will be applicable to the 56 slaughter houses recently surveyed in the Juniata River Basin.

To assist in the first phase of the program, Grant-in-Aid payments up to 50% of the cost of the plans for sewage treatment works, based upon the 1942 price level, are paid to the municipalities from State funds after the plans have been approved by permits issued by the Board. The Grant-in-Aid is toward the cost of the plans for sewage treatment works, including intercepting sewers, pumping stations and related appurtenances but not lateral collecting systems. No funds are provided to assist in

the construction of such facilities. Thus far, Grants-in-Aid totalling $58,608.30 have been paid to 15 municipalities in the Juniata River Basin. The municipalities receiving such aid and the degrees of treatment to be provided are as follows:

Municipality	Degree of Treatment Required	State Grant-in-Aid Toward plans
Altoona (West Plant)	Complete)	$ 19,252.50
Altoona (East Plant)	")	
Bedford		1,250.00
Bellwood	"	1,173.15
Everett	"	3,045.57
Huntingdon	"	8,233.89
Lewistown	"	11,719.89
Logan Township	"	770.45
Mifflin	"	933.05
Mifflintown	"	1,257.26
Millerstown	"	558.88
Mount Union	"	2,853.75
Newport	"	2,025.00
Orbisonia	"	311.09
Saxton	"	1,473.82
Tyrone	"	3,750.00

The anti-pollution laws of Pennsylvania contain provisions relating to the financing of the construction of municipal sewage treatment plants. Municipalities which are ordered to construct sewage treatment plants but do not have sufficient funds available usually acquire such funds through a bond issue. If direct obligation bonds cannot be issued because of constitutional debt limitations, or failure to get consent of the electors, financing can be done by the establishment of a Municipal Authority to construct, improve, maintain and operate sewers and sewage treatment works. In such cases, a system of sewer rental charges is practically always adopted as the method for amortization of the bonds.

A Municipal Authority is created by the governing body of the

governmental subdivision by passage of an ordinance and the members of the Authority are appointed by the governing body which creates the Authority.* The existence of an Authority is limited to 50 years and it must procure a charter from the State before it can operate.

The second phase of the State's program pertains to the construction and operation of the waste treatment facilities. The Sanitary Water Board has issued orders to 21 municipalities requiring the construction and operation of treatment facilities on or before specified dates to serve 22 sources of pollution. Eleven municipalities consisting of Bedford, Burnham, Everett, Huntingdon, Lewistown, Mifflin, Mifflintown, Mount Union, Smithfield Township, Pennsylvania Industrial School and Tyrone have been issued orders requiring the construction and operation of the primary treatment facilities by May 1, 1952, and seven municipalities consisting of Alexandria, Mapleton, Millerstown, Newport, Orbisonia, Port Royal and Saxton by January 1, 1953. The approved secondary units to provide complete treatment are to be constructed on or before such date as the Board may later specify. Altoona has, through agreement with the Board, been given until 1953 to complete its two new sewage treatment plants in a progressive construction program. Bellwood Borough and Granville Township in Mifflin County must complete additions to existing plants in order to provide complete treatment by May 1, 1952. Construction orders have not yet been issued to Logan Township in Blair County and Kistler Borough in Mifflin County.

During the period 1946-1950 waste treatment facilities were installed at five industrial establishments consisting of two sand and gravel washeries, two pulp and paper mills and one coal desilting plant. Treatment works are under construction at one paper mill and two sand and gravel plants.

* Financing Sewage Treatment Works - Pamphlet issued by the Sanitary Water Board, Pennsylvania Department of Health

TABLE G

JUNIATA RIVER BASIN

Progress in Construction of Pollution Abatement Facilities

Year	Sewage Treatment Plants Completed	Design Population	Waste Treatment Plants Completed	Amount of Waste Treated (In terms of Equiv. No. of People
1946	-		-	-
1947	-		-	-
1948	-		1	-
1949	-		-	-
1950	2*		7**	-

* Altoona plants under construction

** Includes 3 plants under construction

Another important aspect of the State's program of stream pollution control involves the discharge of acid mine drainage into the waters of the State. A permit approving proposed plans of drainage from a deep or a strip mining operation must be obtained from the Sanitary Water Board before such operation may commence. The discharge of acid mine drainage into the clean waters of the Commonwealth is prohibited and also the discharge of acid mine drainage and iron into a polluted stream in such amounts as will injuriously affect a clean stream with which it has confluence. The Board also has the right to refuse a permit if it can be shown that mine drainage which would be discharged from the operation would be a potential source of pollution of a clean stream. In this connection, applications have been filed requesting approval of drainage from 27 strip and 58 deep bituminous coal operations to the streams within the Juniata River Basin.

The sealing of abandoned mines and shafts, under a program of the Department of Mines, decreases the acid mine pollution of streams and under State legislation the operators of open pit or strip mining operations must register and post bonds at a rate of $300 per acre to guarantee backfilling, levelling, and planting of the stripped area. A filing fee of $100 annually is required for each bituminous operation for use in planting those areas affected by strip mining prior to May 31, 1945. The acid mine drainage problem in the Juniata River Basin, while serious, is not of major proportions when compared to that of other drainage basins in the State. Mine sealing activities in the Basin are principally by the coal operators. The Department of Mines has sealed some abandoned operations and will extend its program in the area after further work in those basins where acid mine drainage is of greater magnitude and is adversely affecting sources of public water supplies.

Within the Juniata River Basin 28 soil conservation districts have been organized for the conservation of soil and water. Of twenty-two districts constituted since 1945 only one, located in Perry County, has been established along the main stem of the Juniata. Contour farming, terracing, cover cropping and other conservation measures will also reduce the silt loading of the streams.

A flood control project has been authorized to provide protection for the City of Tyrone against a flood discharge equal to the maximum flood of record which occurred in March 1936. The proposed improvements involve the Little Juniata River, Bald Eagle Creek and Sinking Run.

Cooperation in the program for clean streams is greatly facilitated through the educational program of the Sanitary Water Board. The problem of stream pollution with its attendant public health hazards and economic losses are pointed out. This program enlists the support of the public and industry in the measures and procedures necessary to accomplish the control of pollution and thereby obtain full use of the water resources. This activity is conducted through the use of periodicals, colored posters, mailing leaflets, special articles for technical publications, motion pictures, radio, press, working models of installations, the extensive use of photographs and by participation in meetings of civic and educational groups.

POLLUTION PREVENTION MEASURES REQUIRED

To protect and improve the quality of the water in the streams for domestic water supply, animal and aquatic life, industrial consumption and recreational purposes the measures outlined below are needed.

New or improved municipal sewage treatment plants are required for 24 municipal systems which serve a sewered population of 135,700 or about 91% of the total population in the Basin which have municipal sewer facilities. Four municipalities which serve a population of 12,700 or 9% of the sewered population have adequate facilities and require no projects.

TABLE H

JUNIATA RIVER BASIN

Waste Treatment Needs - Municipal*

May 1951

Needs	Number	Population Served by Facilities
New Plant	20	53,500
Enlargement or Additions to Existing Plant	2	4,200
Replace Existing Plant	2	78,000
No Project Required	4	12,700
Undetermined	-	-
	28	148,400

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

It will be noted that four existing plants to serve a population of 82,200 or about 55% of the sewered population in the Basin need improvements or replacement of existing municipal sewage treatment facilities. These are the Altoona, West Plant serving 41,000, East Plant serving 37,000, both of which are under construction, the Bellwood Plant serving 2700, and the Granville Township Plant in Mifflin County serving 1500 persons.

Data available concerning treatment of wastes at industrial establishments indicate corrective measures are needed in 10 instances or about 66% of the reported sources of wastes.

Pollution abatement needs are shown on Map No. 3.

TABLE I

JUNIATA RIVER BASIN

Industrial* Waste Pollution Abatement Needs

May 1951

Needs	Number
New Treatment Plant or other Pollution Control Measures	4
Enlargement or Additions to Existing Plant	5**
Replace Existing Plant	1
Connection to Municipal Sewer System	-
No Project Required	5
Undetermined	-
TOTAL:	15**

* Industries having separate outlets discharging wastes directly to watercourse.

** Includes additions to a separate sewage treatment plant at an industrial establishment.

Considerable progress has been made in the program for the control of municipal pollution in the Juniata River Basin. Construction is underway on the two new plants of the City of Altoona which will serve a population of 78,000 and will take care of the major source of municipal pollution in the Basin. Final plans have been completed for 17 other municipalities which serve a population of 54,100 and produce 36% of the municipal pollution load. Active planning is underway in five municipalities serving a total population of 3600.

TABLE J

JUNIATA RIVER BASIN

Current Status of Municipal* Action

on Pollution Abatement Needs

May 1951

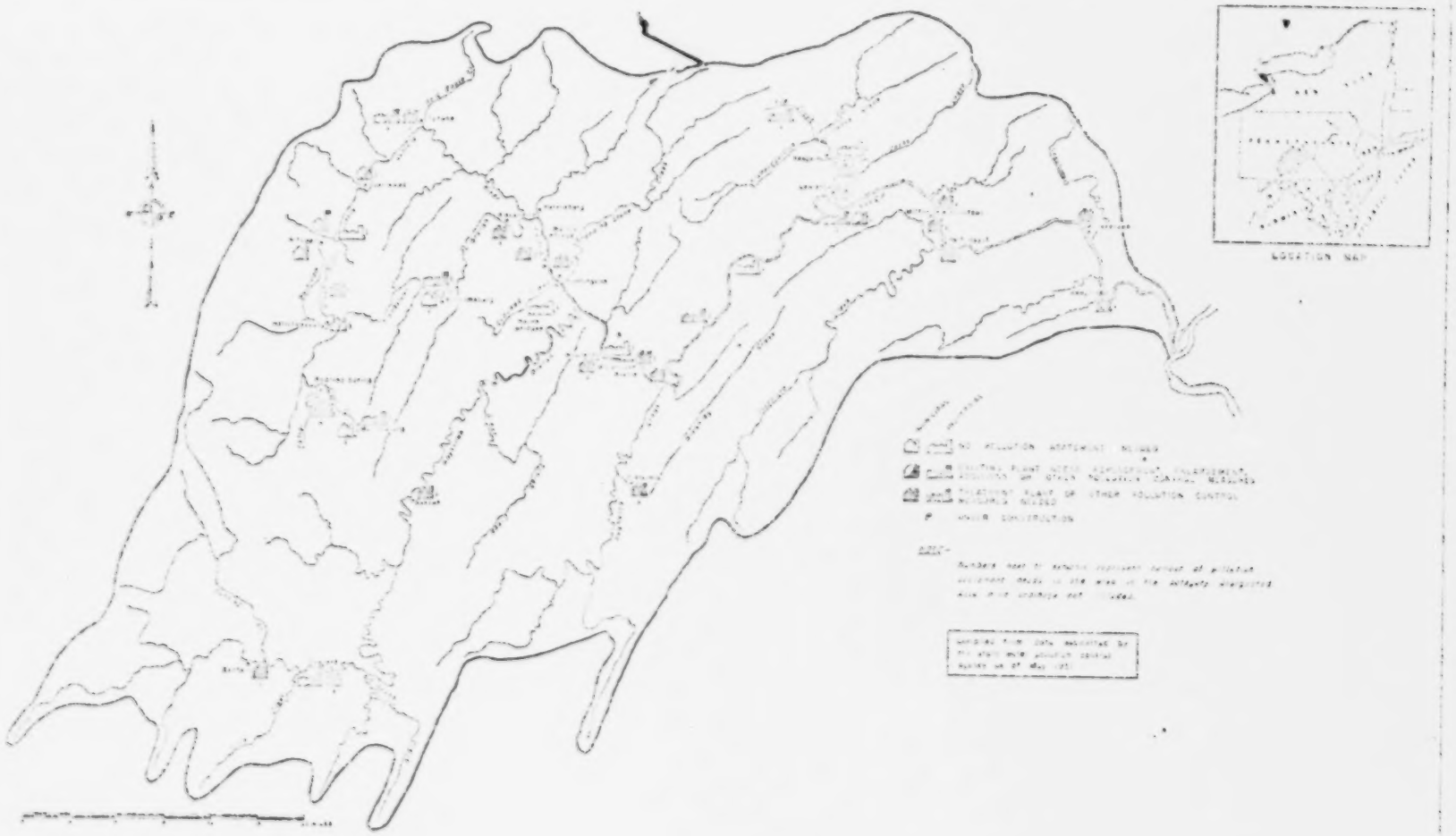
Status of Action	Number of Municipalities	Population Served by facilities
Inactive	-	-
Active Planning**	5	3,600
Final Plans Approved***	17	54,100
Under Construction	2	78,000
TOTAL	24	135,700

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, town; significant institutions, resorts, recreational centers or other population centers.

** Includes preliminary action such as securing engineering services, making survey, preparing plans, arranging for purchase of site, developing financial program, studying means for additional treatment, or consideration of joint treatment with industry or other municipalities.

***Includes plans approved by the Sanitary Water Board, Pennsylvania Department of Health or final plans submitted to said Agency for approval.

The current status of the nine industrial establishments which are in need of new or improved waste treatment facilities is shown in Table K.



SUSQUEHANNA RIVER BASIN
ALLIATA RIVER
POLLUTION ABATEMENT NEEDS
FEDERAL SECURITY AGENCY
PUBLIC HEALTH SERVICE
DIVISION OF WATER POLLUTION CONTROL
MAP NO. 3
MAY 1951

TABLE K

JUNIATA RIVER BASIN

Current Status of Industrial* Action

of Pollution Abatement Needs

May 1951

Status of Action	Number of Industries
Inactive	-
Active Planning**	4
Final Plans Approved***	3 (a)
Under Construction	3
Undetermined	-

* Industries having separate outlets discharging wastes directly to watercourse.

** Includes preliminary action such as securing engineering services, making survey, preparing plans, arranging for purchase of site, developing financial program, studying need for additional, joint or pre-treatment, pilot plant operation, internal process changes , or negotiations with municipality to enter municipal sewer system.

***Includes plans approved by the Sanitary Water Board, Pennsylvania Department of Health, final plans submitted to said Agency for approval or permission granted by municipality for connection to municipal sewer system.

(a)Includes plans for additions to a separate sewage treatment plant at an industrial establishment.

Active planning for additions to existing waste treatment works is underway by the Green Giant Company for its cannery along Plum Creek above Martinsburg in Blair County and by the West Virginia Pulp and Paper Company for its Williamsburg and Tyrone plants. The Mifflin County Packing Company is planning a new waste treatment works for its cannery along Tea Creek above Reedsville in Mifflin County. Final plans have been approved for a new waste treatment works for the Pennsylvania Glass Sand Corporation plant in Wayne Twp., Mifflin County and for additions to the sewage treatment plant and replacement of the industrial waste treatment works for the American Viscose Corporation along the Juniata River. Construction of industrial waste treatment works is 75% complete at the D. M. Bare Paper

Company in Roaring Spring, 95% complete at the New Enterprise Stone and Lime Company plant along Cove Creek near Everett and well under way at the same company's plant near Roaring Spring.

One of the most important aspects of pollution abatement is the problem of financing the construction and operation of municipal sewage treatment works and also industrial waste treatment facilities or changes in plant processes to reduce the pollution load.

In order to abate stream pollution in the Juniata River Basin, municipal sewage treatment plants which will amount to approximately $8,000,000 at present costs are needed. This does not include the cost of necessary lateral collecting sewers. The estimated cost of construction of 16 plants for which plans have been approved is approximately $3,728,000 based upon 1942 price levels. The present construction cost index is however about twice the 1942 index. Data are not available concerning the cost of industrial waste treatment works installed in recent years or the estimated cost of needed waste treatment facilities.

With the first phase of the clean streams program, which involved investigation of sources of municipal and industrial pollution, negotiations with municipal and industrial officials, review of detail plans of waste treatment facilities practically completed in the Juniata River Basin, the routine investigations of the operation of existing municipal and industrial waste treatment plants have been increased. However, in order to complete the information concerning stream pollution and its effects in the Basin, additional data are needed concerning the amount of pollution discharged from the industries, particularly those which produce organic wastes, the quality of the stream water and improvements resulting from pollution control, and data concerning the industrial use of surface waters and quality necessary or desirable for such uses.

The problem of stream pollution from acid mine drainage from coal operations is in need of a practical solution. However, research is being continued into methods of preventing the formation of acid in mine waters.

Consideration should be given to the study of regulated discharges from the dams of the hydro-electric power plants in order to provide more uniform stream flows and improve conditions in the Juniata River.

Much has been accomplished in the reduction of stream pollution in the Juniata River Basin but considerable work remains to be done. A list of the municipalities and industries needing improvements, as of May 1951 for abatement of pollution in the Juniata River Basin is set forth in Table L. Basic data as of May 1951 on the sources of municipal and industrial pollution in the Basin appear in Tables 1 and 2 in the Appendices.

TABLE L

JUNIATA RIVER BASIN

Municipalities and Industries Needing Improvements

for Abatement of Pollution*

May 1951

Alexandria

Altoona - West Plant**

" - East Plant**

Bedford

Bellwood

(Brown Twp., Mifflin County)
Mifflin County Packing Co.

Burnham

Everett

Granville Twp., Mifflin County
American Viscose Corp. (Indus. Wastes)
" " " (Sewage Treatment)

Huntingdon

Kistler

Lewistown

Logan Twp., Blair County

Mapleton

Mifflin

Mifflintown

Millerstown

Mount Union

Newport

(N. Woodbury Twp.,Blair County)
Green Giant Co.

Orbisonia

Port Royal
(Roaring Spring)
D. M. Bare Paper Co.**

Saxton

Smithfield Twp., Huntingdon County
Penna. Industrial School

(Snake Spring Twp., Bedford County)
New Enterprise Stone &
Lime Co.**

(Taylor Twp., Blair County)
New Enterprise Stone &
Lime Co.**

Tyrone
West Virginia Pulp & Paper Co.

(Wayne Twp., Mifflin County)
Penna. Glass Sand Corp.

(Williamsburg)
West Virginia Pulp & Paper Co.

* For details see Tables Nos. 1 and 2. This table does not include municipalities or industries listed with needs undetermined.
** Needed improvements are under construction
( )Municipalities enclosed by parenthesis are not in need of improvements and only indicate the location of the industrial establishment.

BASIC DATA TABLES

The data as of May 1951 listed on the following Basic Data Tables was reported by the Pennsylvania Sanitary Water Board. They are arranged by watershed area which enables the reader to isolate, for any particular area, the amounts and kinds of pollution being discharged and the adequacy of treatment where provided. The principal stream is listed first, starting with the sources of pollution farthest upstream and continuing down to the mouth. Each tributary along with its branches are then covered in downstream order. Those branches which receive no pollution are not listed, while those receiving municipal pollution will be found in Table 1, (Municipal) and similarly, those receiving industrial pollution in Table 2, (Industrial).

The reader is cautioned not to assume the entries as listed to be final. Changing conditions in water uses, pollution contributed, stream quality, information obtained during surveys and other circumstances, may dictate readjustments.

Table 1, applies to municipalities. Included, but not listed, are those industries discharging wastes into municipal sewers. Table 2, applies only to industries discharging directly to a watercourse.

To aid in finding the location of the various sources of pollution, a stream code and river mileage system has been devised. Each of the pollution points on any stream is listed in downstream order beneath the name of that stream, accompanied by its distance in river miles from the mouth of the stream. Tributary streams are further identified by a symbol indicating the stream to which they are tributary and a mileage number indicating in river miles the point at which they join the larger stream. With this information any source of pollution may be located with respect to the mouth of the main stream of the Basin.

Example: To locate the outfall of Roaring Spring listed in Table 1. It is found that Roaring Spring discharges to Halter Creek at a point 1.0 mile from its mouth. Halter Creek (P-2.5) enters Plum Creek at a point 2.5 miles from its mouth. Plum Creek (F-36.7) flows into the Frankstown Branch at a point 36.7 miles from its mouth, and the Frankstown Branch (J-100.0) joins the Juniata River at a point 100 miles above the confluence of the Juniata and the Susquehanna Rivers which has been established as the zero point for the river system covered in this report. Accordingly, Roaring Spring is 140.2 stream miles above the mouth of the Juniata River.

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap.	Adequacy of Treatment Facilities Opr.	P.E. (B.O.D.) Discharged to Watercourse**	Treatment Needs	Remarks Current Status
JUNIATA RIVER									
Smithfield Twp., Huntingdon Co.	93.0	2,700	2,700 E	None			2,700 E	New Plant	Abatement ordered; Final plans approved for complete treatment jointly with Penna. Industrial school; Construction of primary units ordered by May 1,1952
Pennsylvania Industrial School	93.0	1,000	1,000 E	None			1,000 E	New Plant	"
Huntingdon	92.5	7,300	7,300 E	None			7,300 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $840,000; Construction of primary units ordered by May 1, 1952

* Includes incorporated or unincorporated municipalities; other legal bodies as sanitary districts, counties, towns; significant institutions, resorts, recreational centers or other population centers.

** Includes industrial wastes discharged into municipal sewerage systems.

E - Estimated N - Data not available

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap.	Adequacy of Treatment Facilities Opr.	P.E. (B.O.D.) Discharged to Watercourse**	Treatment Needs	Remarks Current Status
JUNIATA RIVER (cont.)									
Mapleton	83.9	400	400 E	None			400 E	New Plant	Abatement ordered; Plans under preparation for complete treatment; Construction of primary units ordered by January 1, 1953.
Mount Union	79.5	4,000	4,000 E	None			4,000 E	New Plant	Abatement ordered, Final plans for complete treatment approved; Estimated 1951 cost $311,000; Construction of primary units ordered by May 1, 1952.
Kistler	79.2	500	500 E	None			500 E	New Plant	Abatement ordered; Plans for primary units under preparation.
Granville Twp., Mifflin Co.	46.0	1,500	-	Primary	Unsat.	Sat.	1,000	Additions	Abatement ordered; Final plans for secondary treatment approved: Construction ordered by May 1, 1952.

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap'y.	Adequacy of Treatment Facilities Opr.	P.E. (B.O.D.) Discharged to Watercourse	Treatment Needs	Remarks Current Status
JUNIATA RIVER (cont)									
Lewistown	46.0	14,000	14,000 E	None			14,000 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $1,168,000 Construction of primary units ordered by May 1, 1952.
Mifflintown	33.9	1,000	1,000 E	None			1,000 E	New Plant	Abatement ordered; Final plans approved for complete treatment jointly with Mifflin; Estimated 1951 cost $192,000; Construction of primary units ordered by May 1, 1952
Mifflin	33.9	400	400 E	None			400 E	New Plant	"
Port Royal	31.3	500	500 E	None			500 E	New Plant	Abatement ordered; Plans under preparation for complete treatment; Construction of primary units ordered by January 1,1953.

Stream Code
J - Juniata River
F - Frankstown Branch (J-100.0)
P - Plum Creek (F-36.7)

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Capy.	Opr.	P.E. (B.O.D.) Discharged to Watercourse	Treatment Needs	Remarks Current Status
JUNIATA RIVER (cont)									
Millerstown	17.6	700	700 E	None			700 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $129,000; Construction of primary units ordered by Jan. 1, 1953.
Newport	12.2	2000	2000 E	None			2000 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $173,000; Construction of primary units ordered by Jan. 1, 1953
FRANKSTOWN BRANCH JUNIATA RIVER J-100									
Williamsburg	28.5	2000	-	Secondary	Sat.	Sat.	300	None	
Alexandria	14.3	200	200 E	None			200 E	New Plant	Abatement ordered; Plans under preparation for complete treatment; Construction of primary units ordered by January 1, 1953.

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Stream Code
J - Juniata River
P - Plum Creek (F-36.7)
F - Frankstown Branch (J-100.0)
B - Beaverdam Branch (F-31.1)

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap'y.	Opr.	P.E. (B.O.D.) Discharged to Watercourse**	Treatment Needs	Remarks Current Status
PLUM CREEK F-36.7									
Martinsburg	8.5	1400	-	Secondary	Sat.	Sat.	900	None	
HALTER CREEK P-2.5									
Roaring Spring	1.0	3200	-	Secondary	Sat.	Sat.	2100	None	
BEAVERDAM BRANCH F-31.1									
Altoona (E.Plant)	9.0	41,000	-	Minor-Screens, Irrigation	Unsat.	Unsat.	26,700	Replacement	Abatement ordered; Two new complete treatment plants under construction in $1,400,000 program to be completed in 1953. The first stage primary treatment units completed at East Plant and under construction at West Plant
Hollidaysburg	2.0	6100	-	Secondary	Sat.	Sat.	900	None	
BRUSH RUN B-0.5									
Logan Twp., Blair Co.	3.5	400	400 E	None			400 E	New Plant	Abatement ordered; Final plans for primary treatment units approved; Estimated 1951 cost $152,000 for treatment plant and $254,000 for sewers.

Stream Code
J - Juniata River
F - Raystown Branch (J-89.7)

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap'y.	Opr.	P.E. (B.O.D.) Discharged to Watercourse	Treatment Needs	Remarks Current Status
LITTLE JUNIATA RIVER	J-100.0								
Altoona (E. Plant)	29.7	37,000	-	Primary	Unsat.	Unsat.	23,000	Replacement	New plant under construction; see remarks for Altoona (W. Plant)
Bellwood	24.2	2,700	-	Primary	Unsat.	Sat.	400	Additions	Abatement ordered; Final plans for secondary treatment approved; Estimated 1951 cost $117,000; Construction ordered by May 1, 1952
Tyrone	15.0	9,000	9000 E	None			9,000 E	New Plant	Abatement ordered; Final plans for complete treatment approved. Estimated 1951 cost $531,000; Construction of primary units ordered by May 1,1952.
RAYSTOWN BRANCH JUNIATA RIVER J-89.7									
Bedford	96.5	3,300	3300 E	None			3,300E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $194,000. Construction of primary units ordered by May 1,1952.

Stream Code
J - Juniata River
A - Aughwick Creek (J-76.5)

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap'y.	Adequacy of Treatment Facilities Opr.	P.E. (B.O.D.) Discharged to Watercourse**	Treatment Needs	Remarks Current Status
RAYSTOWN BRANCH JUNIATA RIVER J-89.7									
Everett	87.0	2,400	2,400E	None			2,400 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $300,000; Construction of primary units ordered by May 1, 1952.
Saxton	44.0	1,200	1,200E	None			1,200 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $131,000; Construction of primary units ordered by January 1, 1953.
BLACKLOG CREEK A-12.0									
Orbisonia	1.0	500	500E	None			500 E	New Plant	Abatement ordered; Final plans for complete treatment approved; Estimated 1951 cost $121,000 for treatment plant and $158,000 for sewers; Construction of primary units ordered by January 1, 1953.

Stream Code
J - Juniata River

TABLE I

JUNIATA RIVER BASIN

Basic Data on Sources of Municipal* Pollution

May 1951

Name and Location	River Mile Above Mouth	Population Served by Sewers	P.E. (B.O.D.) Untr't. Wastes**	Waste Treatment Provided	Adequacy of Treatment Facilities Cap'y.	Adequacy of Treatment Facilities Opr.	P.E. (B.O.D.) Discharged to Watercourse**	Treatment Needs	Remarks Current Status
KISHACOQUILLAS CREEK	J-45.9								
Burnham	3.6	2,000	2,000 E	None			2,000 E	New Plant	Abatement ordered; Plans under preparation for complete treatment. Construction of primary units ordered by May 1, 1952.

TABLE 2

JUNIATA RIVER BASIN

Basic Data on Sources of Industrial* Pollution

May 1951

Name and Location	River Mile Above Mouth	Type of Industry	Type Waste Produced	Treatment or Other Pollution Control Measures			P.E. (B.O.D.) Discharged to Watercourse	Pollution Abatement Needs	Remarks Current Status
				Degree	Adequacy Cap'y.	Adequacy Opr.			
JUNIATA RIVER									
Penna. Glass Sand Corp., Brady Twp., Huntingdon Co.	84.5	Other Mining	Inorg.	Second Equiv.	Sat.	Sat.	N	None	
Penna. Glass Sand Corp. Wayne Twp. Mifflin Co.	68.5	Other Mining	Inorg.	None			N	New Plant	Abatement ordered; Final plans for equivalent complete treatment approved; Construction required by July 1, 1951
Mifflin Sand Co., Bratton Twp., Mifflin Co.	59.0	Other Mining	Inorg.	Second Equiv.	Sat.	Sat.	N	None	
American Viscose Corp., Granville Twp., Mifflin Co.	46.5	Chem & Allied	Org. & Inorg.	Primary Equiv.	Unsat.	Unsat.	N	Replacement	Abatement ordered; Final plans for equivalent complete treatment approved.
"	46.5	"	Organic (Sewage)	Primary	"	Sat.	N	Additions	Need treatment of sugar bearing and yellow liquid wastes. Final plans for complete treatment of sewage approved.

* Industries having separate outlets and discharging wastes directly to watercourse.
N Data not available
NOTE: Information on bituminous coal mining not available.

Stream Code
J - Juniata River
F - Frankstown Branch (J-100.0)
P - Plum Creek (F-36.7)

TABLE 2

JUNIATA RIVER BASIN

Basic Data on Sources of Industrial* Pollution

May 1951

Name and Location	River Mile Above Mouth	Type of Industry	Type Waste Produced	Treatment or Other Pollution Control Measures			P.E. (B.O.D.) Discharged to Watercourse	Pollution Abatement Needs	Remarks Current Status
				Degree	Adequacy Cap'y.	Adequacy Opr.			
FRANKSTOWN BRANCH JUNIATA RIVER J-100.0									
West Virginia Pulp & Paper Co., Williamsburg	28.5	Paper & Allied	Organic	Primary	Unsat.	Sat.	20,000**	Additions	Abatement ordered; Plans under preparation.
PLUM CREEK F-36.7									
Green Giant Co. N. Woodbury Twp., Blair Co.	9.0	Food & Kindred	Organic	Primary Equiv.	Unsat.	Unsat.	N	Additions	Abatement ordered; Plans for additions to provide equivalent complete treatment filed with Sanitary Water Board for approval.
HALTER CREEK P-2.5									
D. M. Bare Paper Co., Roaring Spring	1.3	Paper & Allied	Organic	None			N	New Plant	Abatement ordered; Construction of equivalent complete treatment plant 75% completed.
New Enterprise Stone & Lime Co., Taylor Twp. Blair Co.	0.5	Other Mining	Inorg.	None			N	New Plant	Abatement ordered; Equivalent complete treatment plant under construction. Operation required by October 1, 1951.

** For industries the organic waste load is expressed as population equivalent as measured by B.O.D.

Stream Code
J - Juniata River
L.J.- Little Juniata River (J-100.0)
R-Raystown Branch (J-89.7)
K - Kishacoquillas Creek (J-45.9)

TABLE 2

JUNIATA RIVER BASIN

Basic Data on Sources of Industrial* Pollution

May 1951

Name and Location	River Mile Above Mouth	Type of Industry	Type Waste Produced	Treatment or Other Pollution Control Measures			P.E. (B.O.D.) Discharged to Watercourse	Pollution Abatement Needs	Remarks Current Status
				Degree	Adequacy Cap'y.	Adequacy Opr.			
LITTLE JUNIATA RIVER J-100.0									
Penna. Railroad Co., Logan Twp.,Blair Co.	29.0	Miscella-neous	Org. & Inorg.	Primary Equiv.	Sat.	Sat.	N	None	
BALD EAGLE CREEK L.J.-15.0									
West Virginia Pulp & Paper Co., Tyrone	0.5	Paper & Allied	Organic	Primary	Unsat.	Sat.	N	Additions	Abatement ordered; Plans under preparation.
CROOKED CREEK J-91.9									
New Enterprise Stone & Lime Co., Walker Twp.,Huntingdon Co.	5.5	Other Mining	Inorg.	Second Equiv.	Sat.	Sat.	N	None	
COVE CREEK R-90.0									
New Enterprise Stone & Lime Co., Snake Spring Twp., Bedford Co.	0.2	Other Mining	Inorg.	Primary Equiv.	Unsat.	Sat.	N	Additions	Abatement ordered; Equivalent complete treatment plant under construction is 95% completed.
KISHACOQUILLAS CREEK J-45.9									
Miller Silica Sand Co. Derry Twp., Mifflin Co.	3.0	Other Mining	Inorg.	Second Equiv.	Sat.	Sat.	N	None	
TEA CREEK K-6.5									
Mifflin County Packing Co., Brown Twp.,Mifflin Co.	1.0	Food & Kindred	Organic	None			N	New Plant	Abatement ordered; Plans for equivalent complete treatment under preparation.

APPENDIX A

STREAMS OF THE JUNIATA RIVER BASIN

Juniata River	Tributary to Susquehanna River
Source:*	Formed by junction of Little Juniata River and Frankstown Branch of the Juniata River in Huntingdon County, one mile west of Petersburg.
Course:	Easterly, by circuitous route to Susquehanna River at Duncannon, elevation 334.
Length:	One hundred miles along stream.
Drainage Area:	Contains 3,406 square miles. Average fall about 3 feet per mile including the Raystown Branch and the Frankstown Branch sub-basins. It lies wholly within the Allegheny Mountain region. A series of parallel ridges lying in the northeasterly southwesterly direction, traversing the Basin, have rolling agricultural valleys between the steep slopes. The main valley is narrow, being made up of troughs between parallel ridges and gaps where the stream has cut through on its easterly course. The higher areas are shale and sandstone formations, the valleys being largely limestone areas.
Discharge:	Gaging station at Newport, Pennsylvania. Drainage area above station - 3354 square miles. Records available - 1889-1905, 1907-50 Average Daily Discharge 50 years, 1.28 cfs/sq.mi. Maximum Discharge - (June 1, 1889) 62.4 cfs/sq. mi. Minimum Daily Discharge - (Sept. 25, 1932) 0.09 cfs/sq.mi.

* 1939 - U.S. Board on Geographic Names of the U.S. Department of Interior

APPENDIX A

Frankstown Branch	Tributary to Juniata River
Source:	Formed by junction of Beaverdam Creek and Boiling Spring Run, in Greenfield Township, southern Blair County, elevation 1,164.
Course:	Northeasterly to join Little Juniata River to form Juniata River, one mile west of Petersburg, Huntingdon County.
Length:	Forty-six miles along stream.
Drainage Area:	Contains 400 square miles lying within the Allegheny Mountain region. The main valley lies between well wooded ridges and through gaps and ranges with agriculture in bottom lands. Geological formations are shale, sandstone and limestone; containing some iron ore. The upper basin is especially rich in limestone and contains numerous springs.
Discharge:	Gaging station at Williamsburg, Pennsylvania. Drainage area above station, 291 square miles. Records available 1919-50 Average Daily Discharge - 31 years 1.33 cfs/sq.mi. Maximum Discharge (March 18, 1936) 163.5 cfs/sq.mi. Minimum Daily Discharge - (December 24-25, 1930) 0.11 cfs/sq.mi.

Raystown Branch	Tributary to Juniata River
Source:	Rises about two miles southwest of Deeters Gap in Allegheny Township, Somerset County.
Course:	Easterly to Ray's Hill; thence northeasterly into Huntingdon County to Juniata River about 3 1/2 miles southeast of Huntingdon, Huntingdon County.
Length:	One hundred and eight miles along stream.

Raystown Branch (cont.)	Tributary to Juniata River
Drainage Area:	Contains 964 square miles in Allegheny Mountain region. The main valley is narrow and flanked with high, steep hills which are well wooded. Shale, sandstone and limestone formations, containing some coal and iron ore, predominate.
Discharge:	Gaging station at Saxton, Pennsylvania. Drainage area above station - 756 square miles. Records available 1911-50 Average Daily Discharge - 39 years 1.20 cfs/sq.mi. Maximum Discharge - (March 18, 1936) 106.5 cfs/sq.mi. Minimum Daily Discharge - (October 17-18, 1930) 0.07 cfs/sq.mi.

Aughwick Creek	Tributary to Juniata River
Source:	Formed by junction of Sideling Hill Creek and Little Aughwick Creek, near Maddensville, Springfield Township, southeastern Huntingdon County.
Course:	Northeasterly to Juniata River, 3 miles southeast of Mt. Union.
Length:	Twenty-four and one-half miles along stream.
Drainage Area:	Contains 327 square miles of mountainous country. The wide main basin is bordered by parallel ridges which are gapped in places by tributary streams. Formations are shale, sandstone, and limestone containing bituminous coal deposits at headwaters of Sideling Hill Creek.
Discharge:	Gaging station near Three Springs, Penn. Drainage area above station - 205 sq. miles Records available 1938-50 Average Daily Discharge 12 years 1.09 cfs/sq.mi. Maximum Discharge - (June 2, 1946) 42.8 cfs/sq.mi. Minimum Daily Discharge (August 31, 1938) 0.02 cfs/sq.mi.

APPENDIX A

Tuscarora Creek	Tributary to Juniata River
Source:	In Tell Township, southeastern Huntingdon County.
Course:	Northeasterly, into Juniata County, to Juniata River at Port Royal, Pennsylvania.
Length:	Forty-five miles along stream
Drainage Area:	Contains 256.1 square miles of mountainous country with the broad main valley containing rolling agricultural land bounded by parallel ridges of the Allegheny Mountains, the slopes of which are well wooded. Geological formations are shale, sandstone and limestone.
Discharge:	Gaging station near Port Royal, Pennsylvania. Drainage area above station - 214 square miles. Records available - 1911-1950 Average Daily Discharge - 39 years 1.19 cfs/sq.mi. Maximum Discharge (March 18, 1936) 67.3 cfs/sq.mi. Minimum Discharge - (1913-1914)* 0.005 cfs/sq.mi. *(Aug. 31, Sept. 4-6, 14, 18, 1913, Sept. 21, 1914)

Sources:
1. Water Resources Inventory Report, Water Supply Commission of Pennsylvania 1917
2. U.S. Geological Survey, Harrisburg, Pennsylvania
3. Corps of Engineers, Department of the Army

APPENDIX B

JUNIATA RIVER BASIN

Population - Counties - Incorporated Municipalities

	1900	1920	1940	1950
Bedford County - 40,775 (1950) 40,809 (1940)				
Bedford	2,167	2,330	3,268	3,521
Coaldale	348	300	273	231
Everett	1,864	1,687	2,425	2,297
Hopewell	482	516	405	360
Manns Choice	312	274	306	313
New Paris	205	197	201	202
Pleasantville	218	191	232	242
Rainsburg	219	186	211	189
St. Clairsville	102	97	114	127
Saxton	937	1,165	1,152	1,093
Schellsburg	312	290	328	305
Woodbury	226	246	271	254
Blair County - 139,514 (1950) 140,358 (1940)				
City of Altoona	39,973	60,331	80,214	77,177
Bellwood	1,545	2,629	2,772	2,559
Duncansville	1,512	1,230	1,415	1,391
Hollidaysburg	2,998	4,071	5,910	6,483
Martinsburg	590	955	1,396	1,562
Newry	350	397	417	412
Roaring Spring	1,344	2,379	2,724	2,771
Tyrone	5,847	9,084	8,845	8,214
Williamsburg	935	1,872	1,898	1,792

APPENDIX B

Huntingdon County - 40,872(1950) 41,836(1940)	1900	1920	1940	1950
Alexandria	406	440	442	443
Birmingham	240	197	198	178
Broad Top City Borough	258	519	610	483
Cassville	168	133	142	158
Coalmont	182	220	162	207
Dudley	290	491	410	350
Huntingdon	6,053	7,051	7,170	7,330
Mapleton	612	802	803	742
Marklesburg	260	198	198	219
Mill Creek	-	286	362	417
Mount Union	1,086	4,744	4,763	4,690
Orbisonia	653	682	729	648
Petersburg	781	691	636	621
Rockhill	495	500	548	567
Saltillo	377	418	433	435
Shade Gap	138	136	156	157
Shirleysburg	230	200	242	241
Three Springs	196	345	427	417
JUNIATA COUNTY - 15,243(1950) 15,373(1940)				
Mifflin	817	965	860	835
Mifflintown	953	1,083	1,097	1,013
Port Royal	546	558	744	800
Thompsontown	273	306	500	486

APPENDIX B

	1900	1920	1940	1950
Mifflin County - 43,691 (1950) 42,993 (1940)				
Burnham	-	2,765	2,997	2,954
Kistler		-	494	468
Lewistown	4,451	9,849	13,017	13,894
McVeytown	520	480	581	546
Newton Hamilton	384	400	395	397
Perry County - 24,782 (1950) 23,213 (1940)				
Millerstown	555	616	684	682
Newport	1,734	1,972	1,897	1,893
Somerset County - 81,813 (1950) 84,957 (1940)				
New Baltimore	201	174	260	221

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

County Municipality	Str.	Well	Spr.	Owner	Pop. 1940	Est. Pop. Served 1949	Av. Plant Output, G.P.D. 1949	Treatment Filt.	Chlor.	None	Remarks
Bedford County											
Bedford	x			M	2,411	3,205	200,000		x		Streams (Imp.)
Coaldale	x		x	P	273	180	9,000			x	
Defiance			x	P	(350)	350	20,000			x	
Everett			x	P	2,425	3,000	150,000		x		
New Enterprise			x	P	(220)	500	25,000			x	
Osterburg											Water supply system completed (1951)
Rainsburg			x	M	211	220	15,000			x	
Salemville			x	P	(63)	150	10,000			x	
Saxton	x	x		M	1,152	1,500	120,000		x		Putts Hollow Run, Miller Run, Drilled well
St. Clairsville											
Waterside*			x	P	(115)	500	28,000			x	Water supply system under constr. (1951)
Woodbury			x	M	271	500	12,000			x	

* Waterside also serves Loysburg

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

County Municipality	Str.	Well	Spr.	Owner	Pop. 1940	Est. Pop. Served 1949	Av. Plant Output G.P.D. 1949	Treatment Filt.	Chlor.	None	Remarks
Blair County											
Altoona	x	x		M	80,214	82,000	7,000,000		x		Drilled wells and imp. reserv.
Bellemeade Civic Org.		x		P		200	10,000			x	
Bellwood	x			M	2,772	3,300	250,000		x		Bells Gap Run
Claysburg		x	x	P	1,387	700	90,000		x		Drilled well & Weyant Spring
Duncansville	x			M	1,415	1,500	30,000			x	Gillian Run
E. Altoona	x			P		500	25,000		x		Green Spring Run
E. Sharpsburg			x	P	(100)	150	15,000			x	
Greenwood			x	P	1,332	600	24,000		x		
*Hollidaysburg	x			M	5,910	7,000	750,000			x	Blair Gap, Dry Gap and Roaring Run
Martinsburg	x	x		M	1,396	1,400	150,000		x		Streams and wells
Roaring Spring	x		x	M	2,724	3,000	240,000		x		Riddle and Rainly Hollow Runs, Springs

* Hollidaysburg also serves Frankstown Twp., Blairmount Country Club, and Duncansville (Aux.)

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

County Municipality	Str.	Well	Spr.	Owner	Pop. 1940	Est. Pop. Served 1949	Av. Plant Output, G.P.D. 1949	Treatment Filt.	Chlor.	None	Remarks
Blair County (cont)											
Sproul		x	x	P	(300)	450	100,000		x		
Tyrone	x			M	8,845	10,500	1,800,000		x		Sink Run and Decker Hollow Run
Tyrone (Bald Eagle Water Co)	x		x	P		650	(1,600) (6,000,000 Indus.)		x		Cold, Hundred and Logan Springs. Bald Eagle Creek (Boilers only)
Williamsburg	x			M	1,898	2,000	300,000		x		Schmucker Run and Share Hollow Run
Fulton County											
Wells Tannery			x	P	(117)	200	6,000			x	
Huntingdon County											
Alexandria	x	x		P	442	500	50,000			x	Robinson Run and drilled wells
Blairs Mills			x	P	(100)	200	15,000			x	
Cassville			x	P	142	30	1,500			x	
Huntingdon	x			M	7,170	10,000	1,500,000	x			Standing Stone Creek

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

County Municipality	Str.	Well	Spr.	Owner	Pop. 1940	Est. Pop. Served 1949	Av. Plant Output, G.P.D. 1949	Treatment Filt.	Chlor.	None	Remarks
Huntingdon County (Cont)											
Huntingdon Industrial Scl.			x	P	(950)	950	400,000		x		
Mapleton	x		x	M	803	600	30,000		x		Scrub Run, 3 Springs
*Mount Union	x			M	4,763	7,000	600,000		x		Streams
Neelyton			x	P		125	6,200			x	
*Orbisonia			x	P	729	1,275	60,000		x		
Petersburg	x			M	638	700	100,000		x		Reeds Run
Robertsdale	x		x	P	(1,119)	1,600	100,000		x		McClains Runs and Trough Creek (Imp.) Springs
Saltillo		x		P)		180)	4,000)			x	
			x	M)	433	80)	2,000)			x	
Three Springs		x	x	M	427	450	20,000			x	
Warriors Mark			x	P		300	15,000		x		

* Mount Union also serves Kistler in Mifflin County.
Orbisonia also serves Rockhill

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

County Municipality	Str.	Well	Spr.	Owner	Pop. 1940	Est. Pop. Served 1949	Av. Plant Output, G.P.D. 1949	Treatment			Remarks
								Filt.	Chlor.	None	
Juniata County											
McAllisterville		x	x	P	(450)	300	20,000			x	
Mifflin	x			P	860	900	35,000		x		Macedonia Run
Mifflintown	x			P	1,097	2,000	45,000		x		Macedonia Run
Port Royal		x	x	P	744	1,000	50,000			x	Springs and drilled well
Richfield			x	P	(280)	280	13,000		x		
Thompsontown	x		x	P	500	325	25,000		x		Springs and streams
Mifflin County											
Allensville			x	P	275	275	10,000			x	
Bellsville	x			M	(1,156)	1,500	75,000			x	Rock Run & Campbell Run
Hawstone	x			P	(300)	300	30,000		x		Creek
*Lewistown	x			M	13,017	25,000	4,250,000		x		Reservoir (Imp.)
McVeytown			x	P	581	50	2,500			x	

*Lewistown also serves Burnham, Granville-Heights, Highland Park, Milroy, Reedsville and Yeagertown

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

County Municipality	Str.	Well	Spr.	Owner	Pop. 1940	Est. Pop Served 1949	Av. Plant Output, G.P.D. 1949	Treatment Filt.	Chlor.	None	Remarks
Mifflin County (Cont)											
Newton Hamilton		x		P	395	395	25,000		x		
Whitehall			x	P		100	5,000			x	Hostetter Springs
Perry County											
Millerstown	x	x	x	M	684	685	25,000			x	Potash Run, Springs, Well
Newport	x			P	1,897	3,000	100,000) 70,000)	x	x		Hunter Valley Run, Perry Valley Run Juniata River

APPENDIX C

JUNIATA RIVER BASIN

Public Water Supply Data

Owner - Treatment	Source of Supply			Number of Water Systems	Estimated Population Served 1949	Average Plant Output G. P. D. 1949
	Str.	Well	Spr.			
Municipal						
Filt.	1	-	-	1	10,000	1,500,000
Chlor.	12	3	2	12	140,205	15,040,000
None	4	2	5	8	11,935	929,000
	17	5	7	21	162,140	17,469,000
Private						
Filt.	1	-	-	1	3,000	70,000
Chlor.	7	3	11	16	14,225	1,318,600
None	2	5	15	18	4,990	287,200
	10	8	26	35	22,215	1,675,800
Total						
Filt	2	-	-	2	13,000	1,570,000
Chlor.	19	6	13	28	154,430	16,358,600
None	6	7	20	26	16,925	1,216,200
TOTALS:	27	13	33	56	184,355	19,144,800

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